

WHAT IS CLAIMED AS NEW AND DESIRED TO BE SECURED BY LETTER

PATENT OF THE UNITED STATES IS:

1. An image forming apparatus, comprising:  
a light beam generating and modulating device configured  
to generate and modulate a light beam in accordance with an  
image signal;  
a light beam deflecting device configured to deflect  
the light beam modulated by the light beam generating and  
modulating device and to scan an image carrier so as to form  
10 an image;  
a pair of light beam detecting device configured to  
detect the light beam deflected by the deflecting device at  
two separate positions on a main scanning line, said pair of  
light beam detecting device generating both of a reference time  
15 difference and at a prescribed temperature and a time difference  
to be compared with the reference time difference in a  
prescribed timing during image formation;  
a time difference measuring device configured to measure  
a time difference between time periods when the light beam is  
20 detected by one of the light beam detecting devices and when  
that is detected by the other of light beam detecting devices;  
an image magnification correcting device configured to  
change a write clock frequency of the light beam and the rotation  
number of the light deflecting device in accordance with the

time difference detected by the time difference measuring device so as to correct magnification error in the main scanning direction of the image on the image carrier, said write clock frequency controlling image data writing density of the light

5 beam; and

a visualizing device configured to visualize the image on the image carrier written by the light beam.

2. An image forming apparatus, comprising:

10 a plurality of light beam generating and modulating devices each configured to generate and modulate a light beam in accordance with a different mono color image signal;

15 at least one light beam deflecting device configured to deflect a plurality of light beams modulated by the plurality of light beam generating and modulating devices and to scan an image carrier so as to form a prescribed superimposed image, one of said plurality of light beams being scanned in a direction opposite to that of the other light beam;

20 a pair of light beam detecting device configured to detect one of the light beams deflected by the at least one light beam deflecting device at two separate positions on a main scanning line, said pair of light beam detecting device generating both of a reference time difference and at a prescribed temperature and a time difference to be compared

with the reference time difference in a prescribed timing during image formation;

a time difference measuring device configured to measure a time difference between time periods when one of the plurality 5 of light beams is detected by one of the light beam detecting devices and when that is detected by the other of light beam detecting devices;

an image magnification correcting device configured to change a plurality of write clock frequencies of the plurality 10 of laser beams, respectively, and the rotation number of the at least one light beam deflecting device in accordance with the time difference detected by the time difference measuring device so as to correct magnification error in the main scanning direction of the superimposed image on the image carrier, said 15 write clock frequency controlling image data writing density of the light beam; and

a visualizing device configured to visualize the superimposed image on the image carrier written by the plurality of light beams.

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3. An image forming apparatus according to claim 1, wherein said image magnification correcting device changes the rotation number of the light beam deflecting device if magnification error is not completely corrected by changing

the write clock frequency.

4. An image forming apparatus according to claim 1,  
wherein said image magnification correcting device changes the  
5 write clock frequency and the rotation number based on a newly  
measured time difference after initializing the last rotation  
number of the light beam deflecting device.

5. An image forming apparatus according to claim 1,  
10 further comprising an image write start position adjusting  
device configured to adjust an image write start position in  
the main scanning direction on the image carrier in accordance  
with the time difference detected by the time difference  
measuring device.

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6. An image forming apparatus, comprising:  
a light beam generating and modulating device configured  
to generate and modulate a light beam in accordance with an  
image signal;  
20 a light beam deflecting device configured to deflect  
the light beam modulated by the light beam generating and  
modulating device and to scan an image carrier so as to form  
an image;  
an optical unit configured to include an  $f\theta$  lens

configured to convert the light beam from substantially the uniform angular speed scanning light to substantially the uniform speed scanning light;

5 a temperature detecting device configured to detect temperature of the optical unit;

an image magnification correcting device configured to change a write clock frequency of the light beam and the rotation number of the light deflecting device in accordance with the temperature detected by the temperature detecting device so 10 as to correct magnification error in the main scanning direction of the image on the image carrier, said write clock frequency controlling image data writing density of the light beam; and a visualizing device configured to visualize the image on the image carrier written by the light beam.

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7. An image forming apparatus, comprising:

a plurality of light beam generating and modulating devices each configured to generate and modulate a light beam in accordance with a different mono color image signal;

20 at least one light beam deflecting device configured to deflect a plurality of light beams generated and modulated by the plurality of light beam generating and modulating devices and to scan an image carrier so as to form a prescribed superimposed image, one of said plurality of light beams being

scanned in a direction opposite to that of the other light beam;  
an optical unit configured to include an  $f\theta$  lens  
configured to convert the light beam from substantially the  
uniform angular speed scanning light to substantially the  
5 uniform speed scanning light;  
a temperature detecting device configured to detect  
temperature of the optical unit;  
an image magnification correcting device configured to  
change a plurality of write clock frequencies of the plurality  
10 of laser beams and the rotation number of the at least one light  
beam deflecting device in accordance with the temperature of  
the optical unit so as to correct magnification error in the  
main scanning direction of the images on the image carrier,  
said write clock frequency controlling image data writing  
15 density by the light beam; and  
a visualizing device configured to visualize the  
superimposed image on the image carrier written by the plurality  
of light beams.

20 8. An image forming apparatus according to claim 6,  
wherein said temperature is of the  $f\theta$  lens.

9. An image forming apparatus according to claim 1,  
wherein said time difference measuring device measures the time

difference after lowering a light beam deflection speed of the light beam deflecting device so as to precisely obtain a reference time difference by counting prescribed pulses.

5           10. An image forming apparatus according to claim 2, wherein said time difference measuring device measures the time difference after lowering a light beam deflection speed of the light beam deflecting device so as to precisely obtain a reference time difference by counting prescribed pulses.

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11. An image forming apparatus according to claims 1 and 2, wherein said light beam deflecting device includes a polygon mirror.

15           12. An image forming apparatus according to claim 9, wherein said light beam deflection speed is only lowered when the time difference is detected, and returned to a level used for image formation.

20           13. An image forming apparatus according to claim 9, wherein said light beam deflection speed is low when starting light beam deflection so as to precisely obtain a reference time difference.

14. An image forming apparatus according to claim 9,  
wherein said time difference is measured without lowering the  
light beam deflection speed when continuous printing is  
executed and time difference is detected so as to only detect  
5 needs of image magnification correction, and said  
magnification correction is executed based on a time difference  
detected after lowering the light beam deflection speed in a  
prescribed timing corresponding to an interval of sheets.

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ABSTRACT

An image forming apparatus includes a light beam generating and modulating device which generates and modulates a light beam in accordance with an image signal, a light beam 5 deflecting device which deflects the modulated light beam and scans an image carrier so as to form an image.

a pair of light beam detecting device is provided to detect the light beam deflected by the deflecting device at two separate positions on a main scanning line. The pair of 10 light beam detecting device generates both of a reference time difference and at a prescribed temperature and a time difference to be compared with the reference time difference in a prescribed timing during image formation. A time difference measuring device is provided to measure a time difference 15 between time periods when the light beam is detected by one of the light beam detecting devices and when that is detected by the other of light beam detecting devices. An image magnification correcting device is also provided to change a write clock frequency of the light beam and the rotation number 20 of the light deflecting device in accordance with the time difference so as to correct magnification error in the main scanning direction of the image on the image carrier. A visualizing device is provided to visualize the image on the image carrier written by the light beam.

FIG

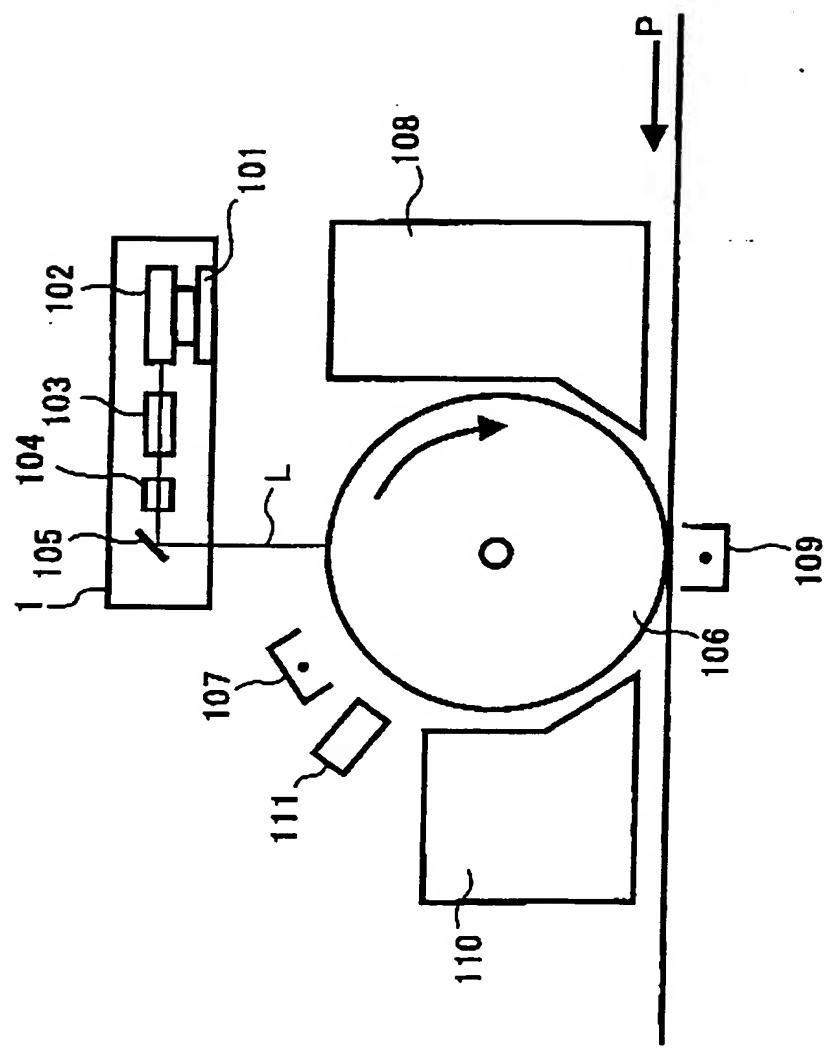


FIG. 2

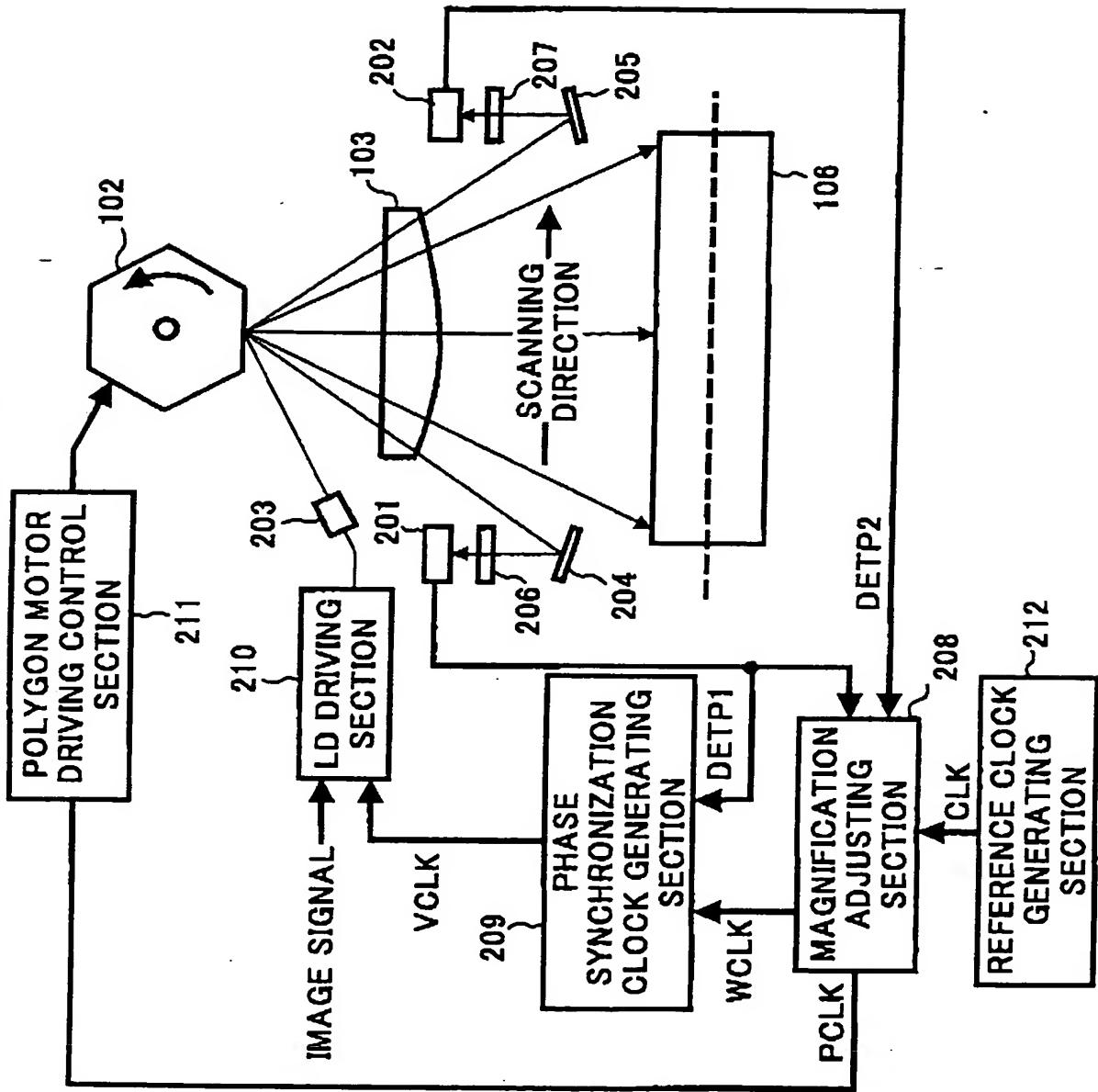


FIG. 3

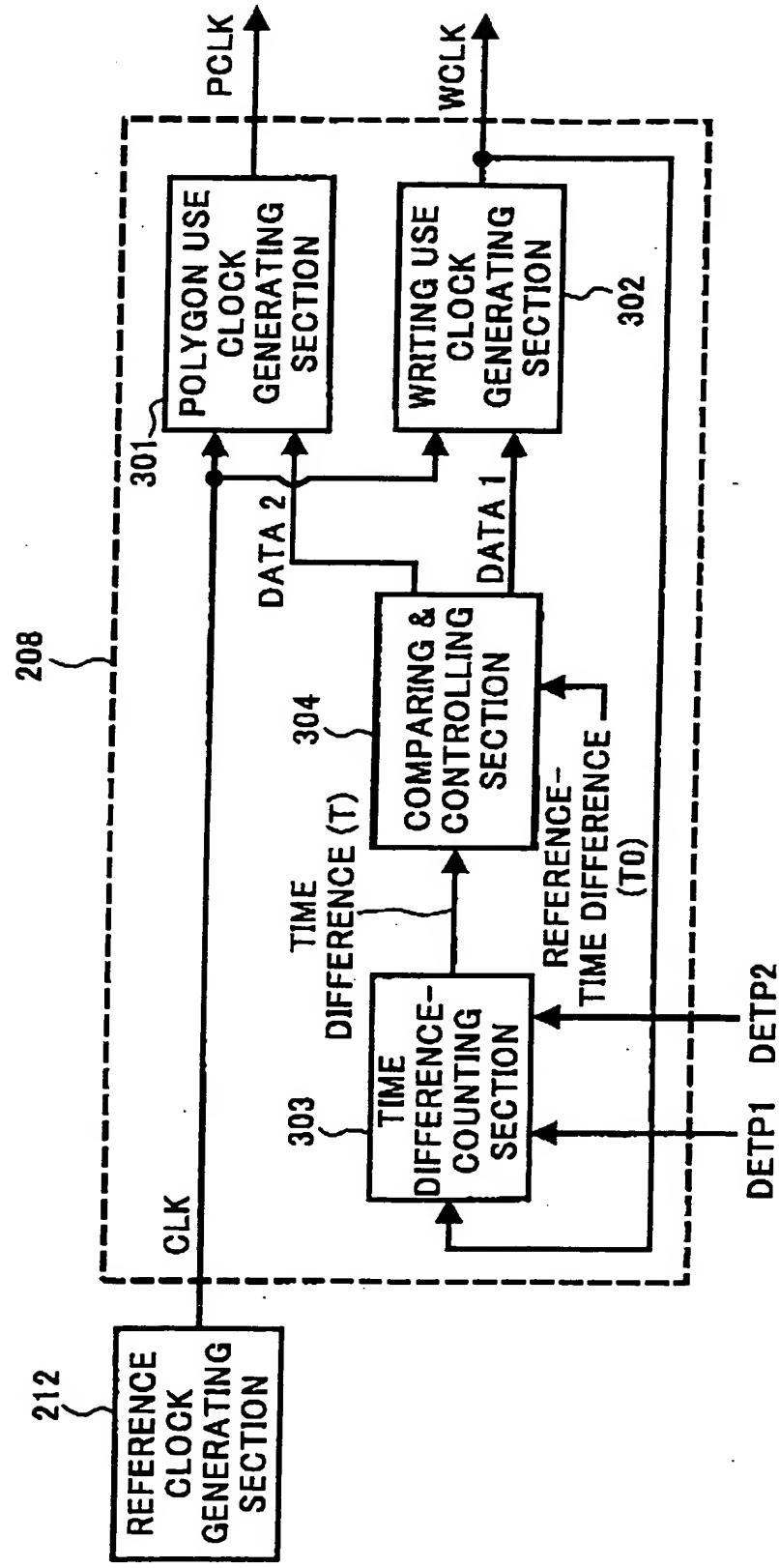


FIG. 4

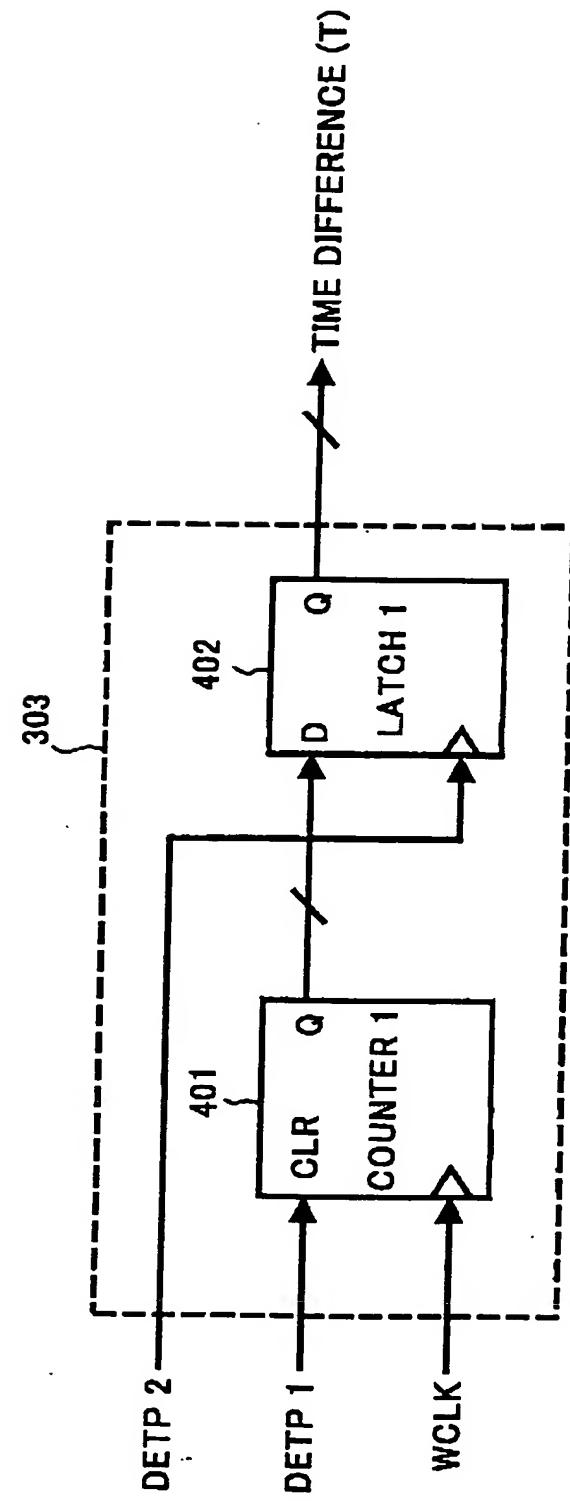


FIG. 5

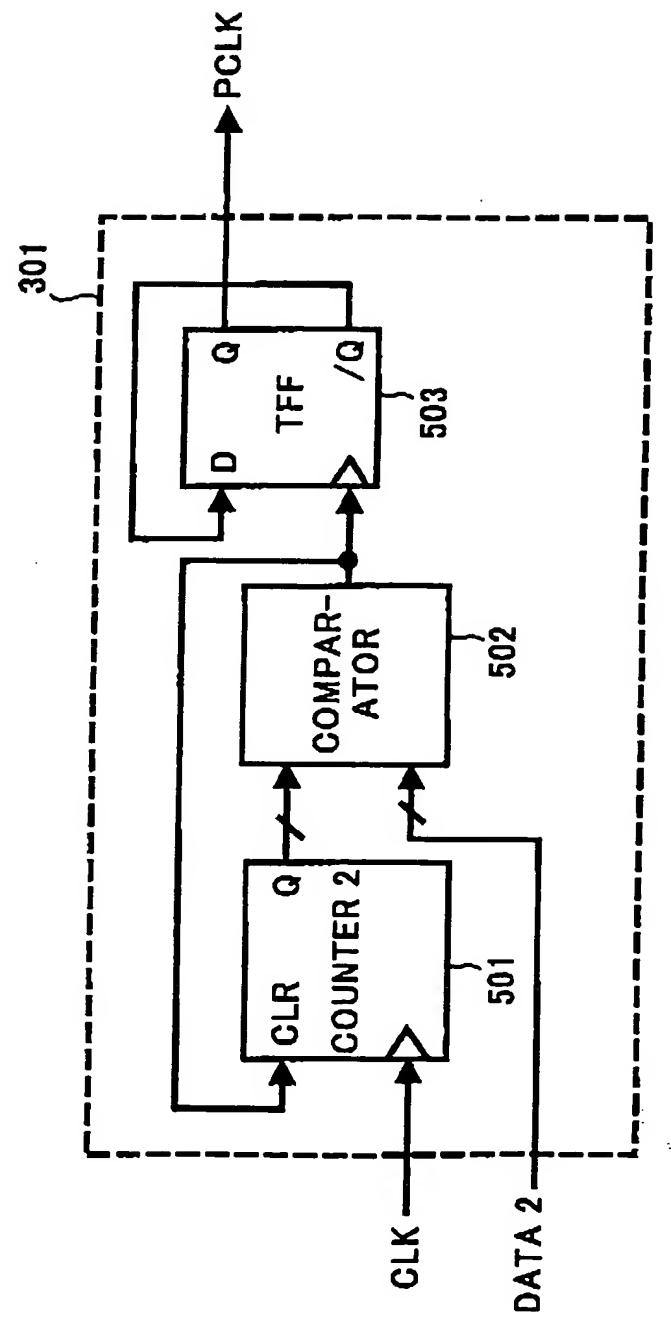


FIG. 6

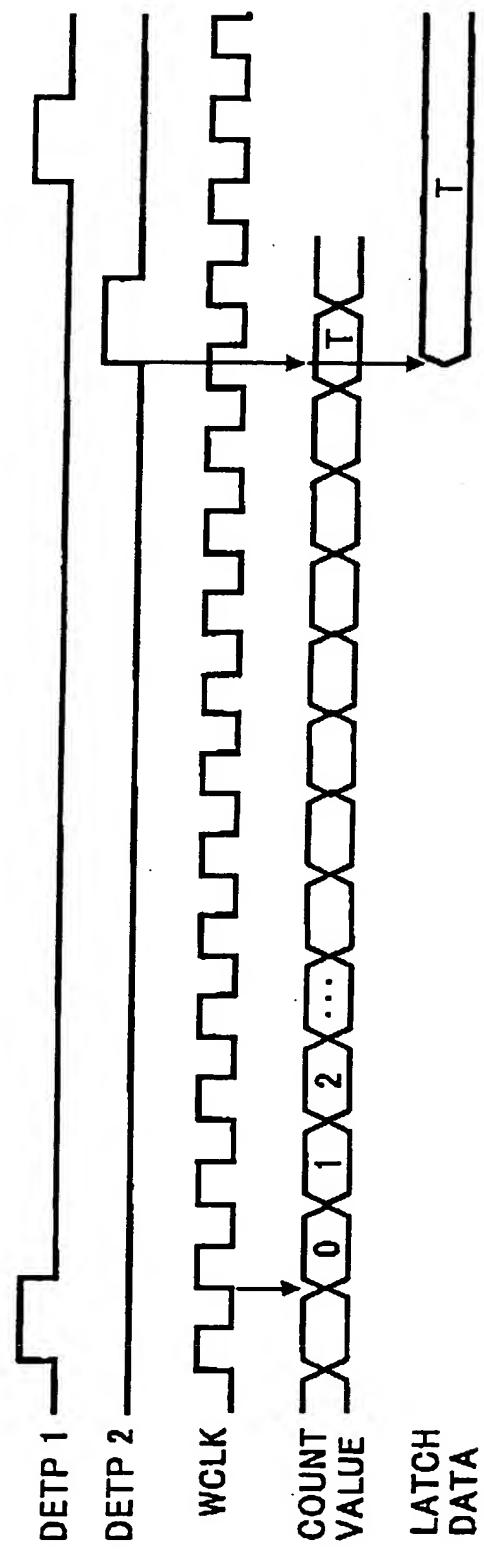


FIG. 7

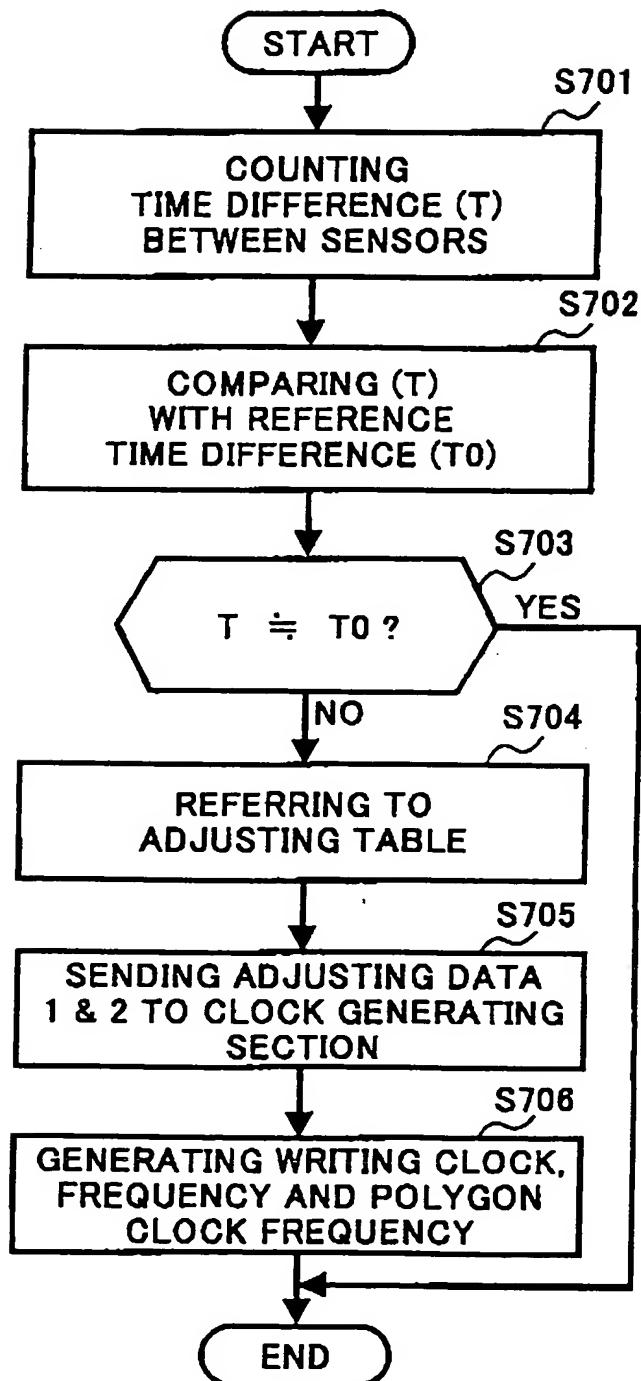


FIG. 8

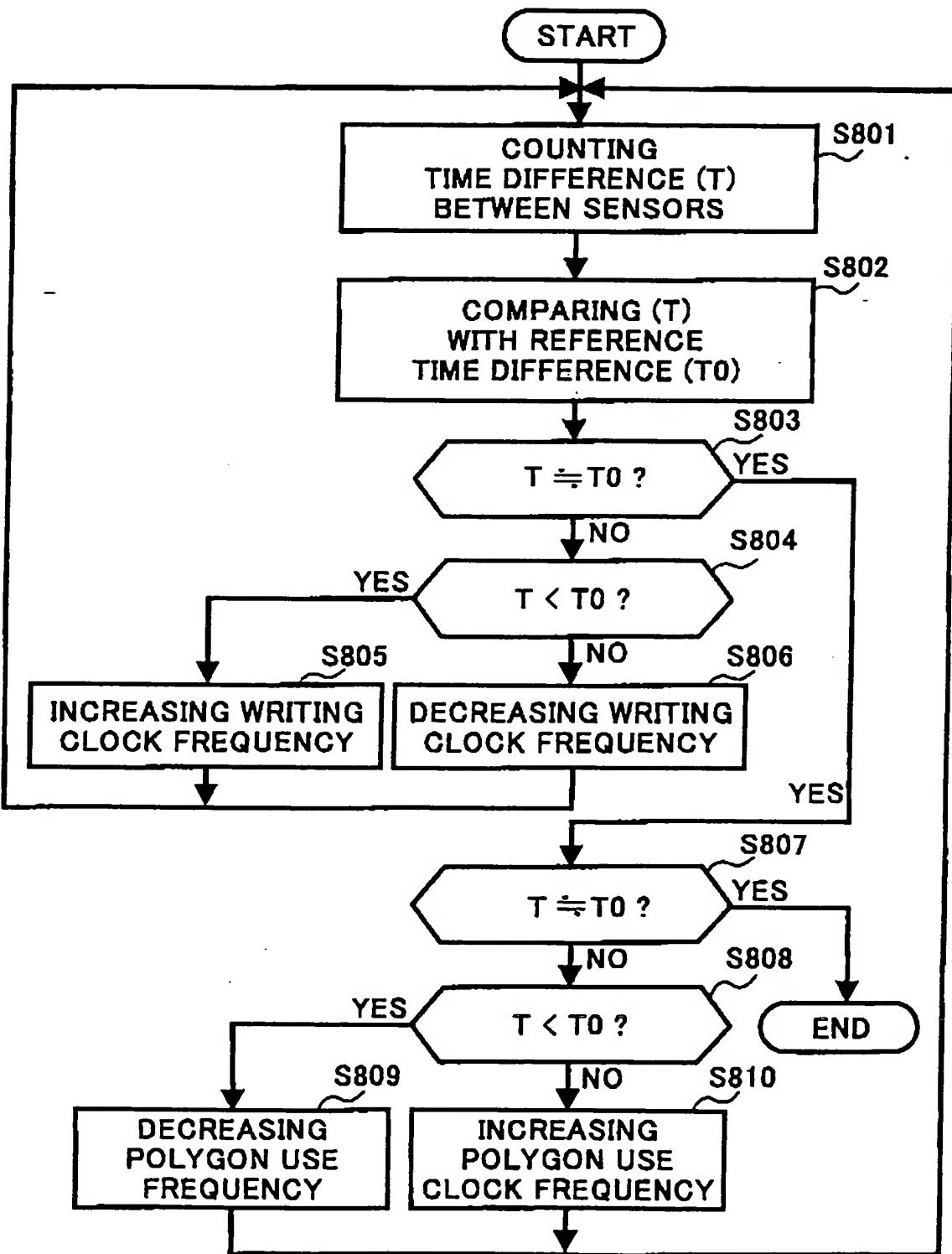


FIG. 9

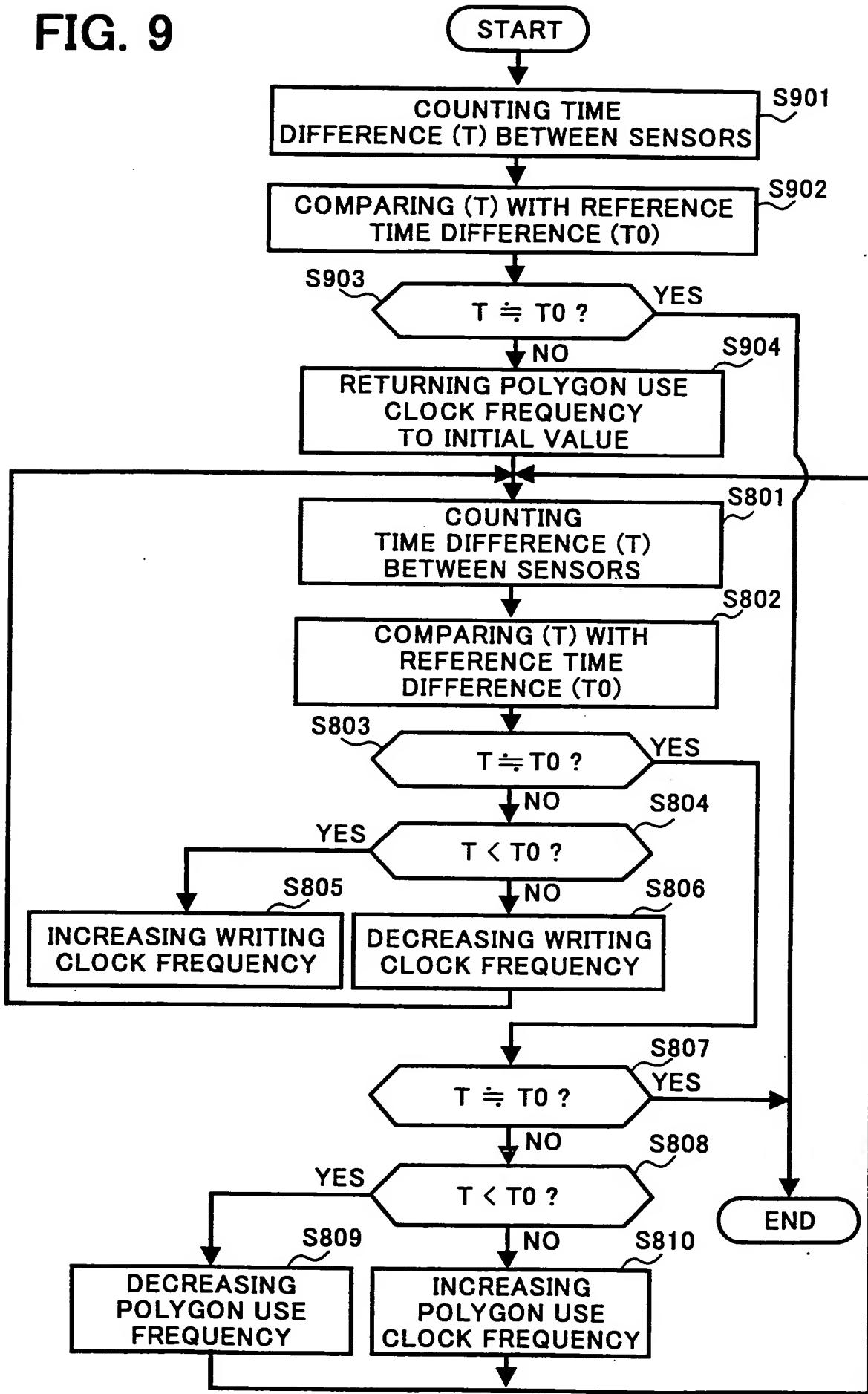


FIG. 10

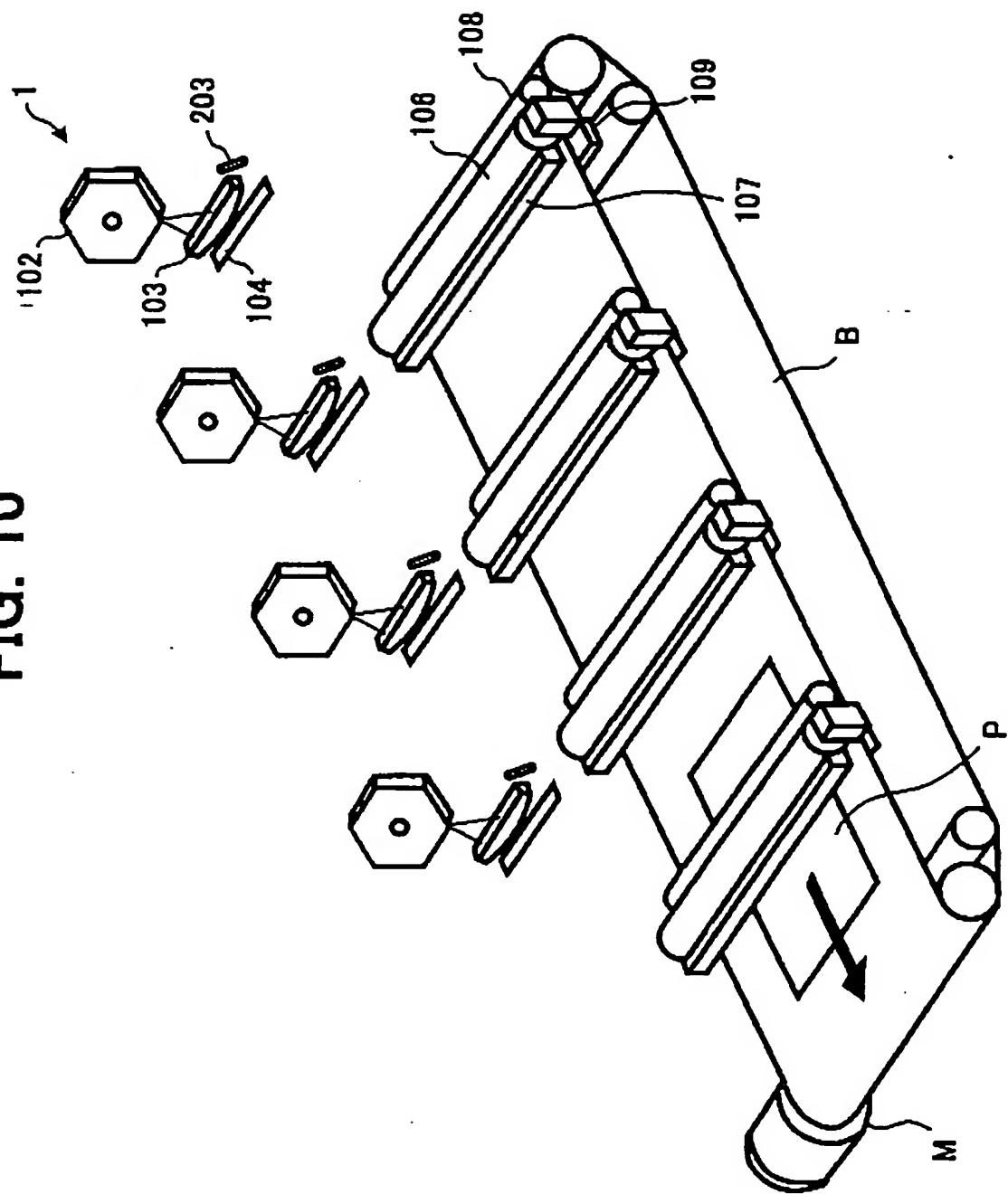


FIG. 11

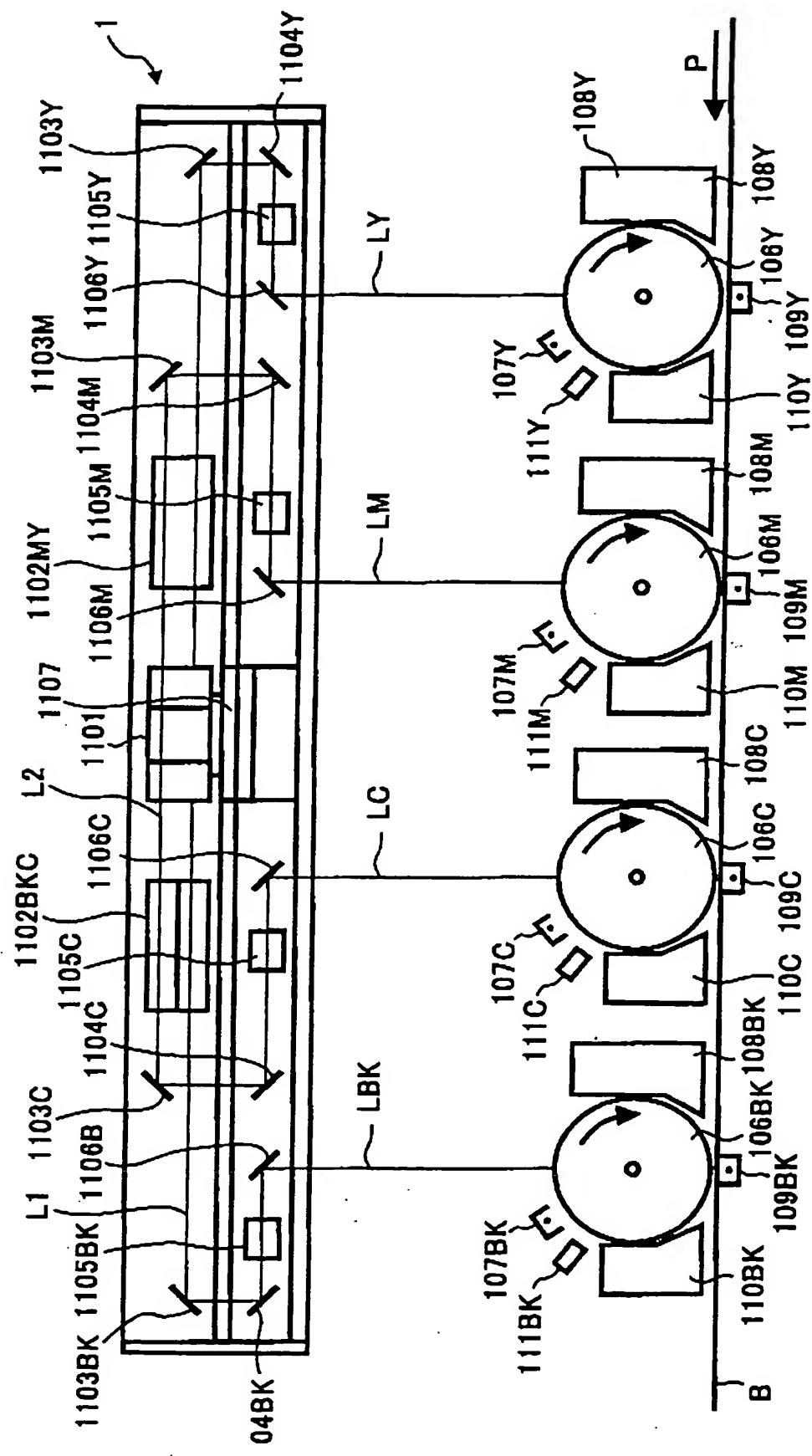


FIG. 12

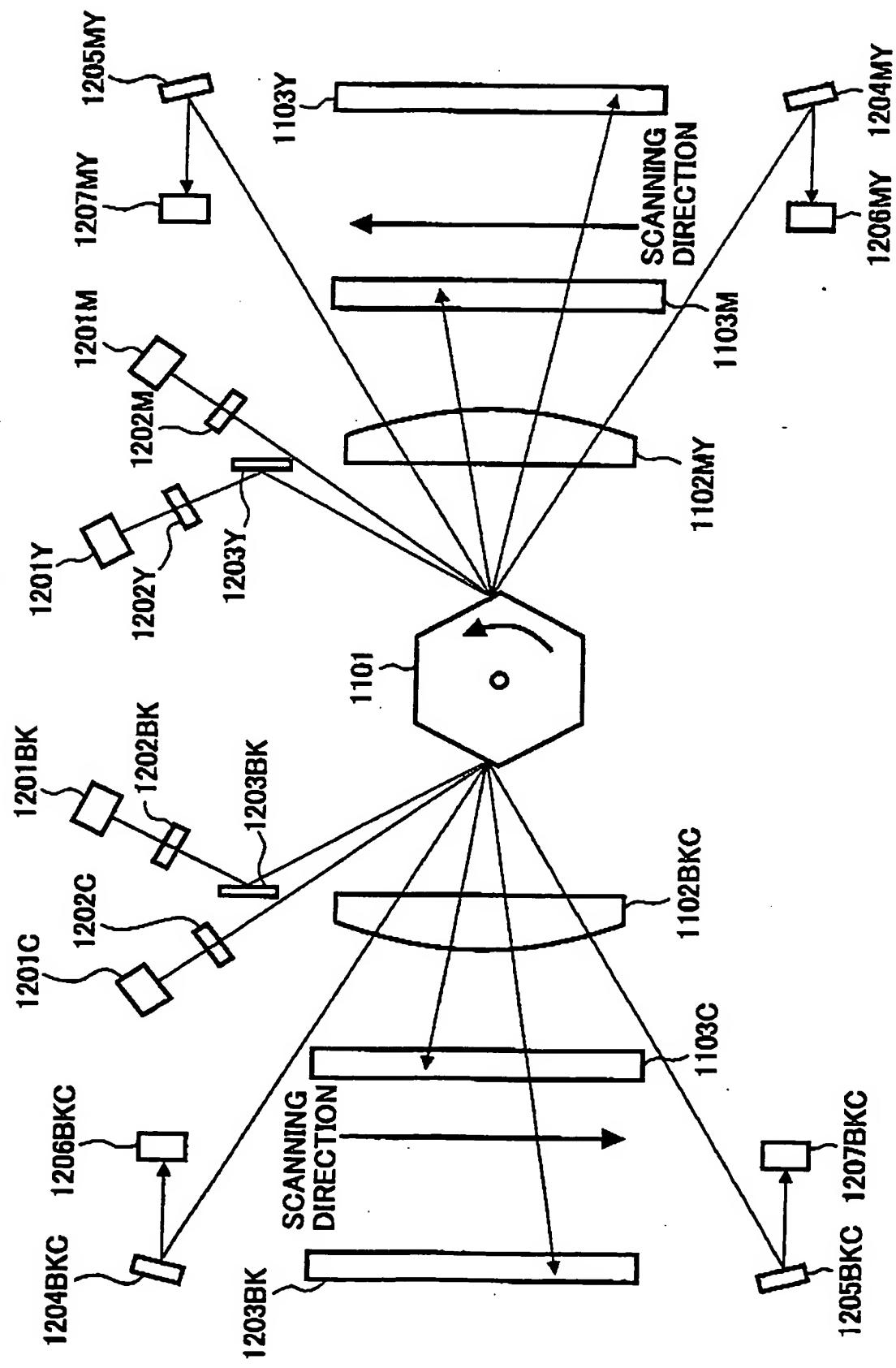


FIG. 13

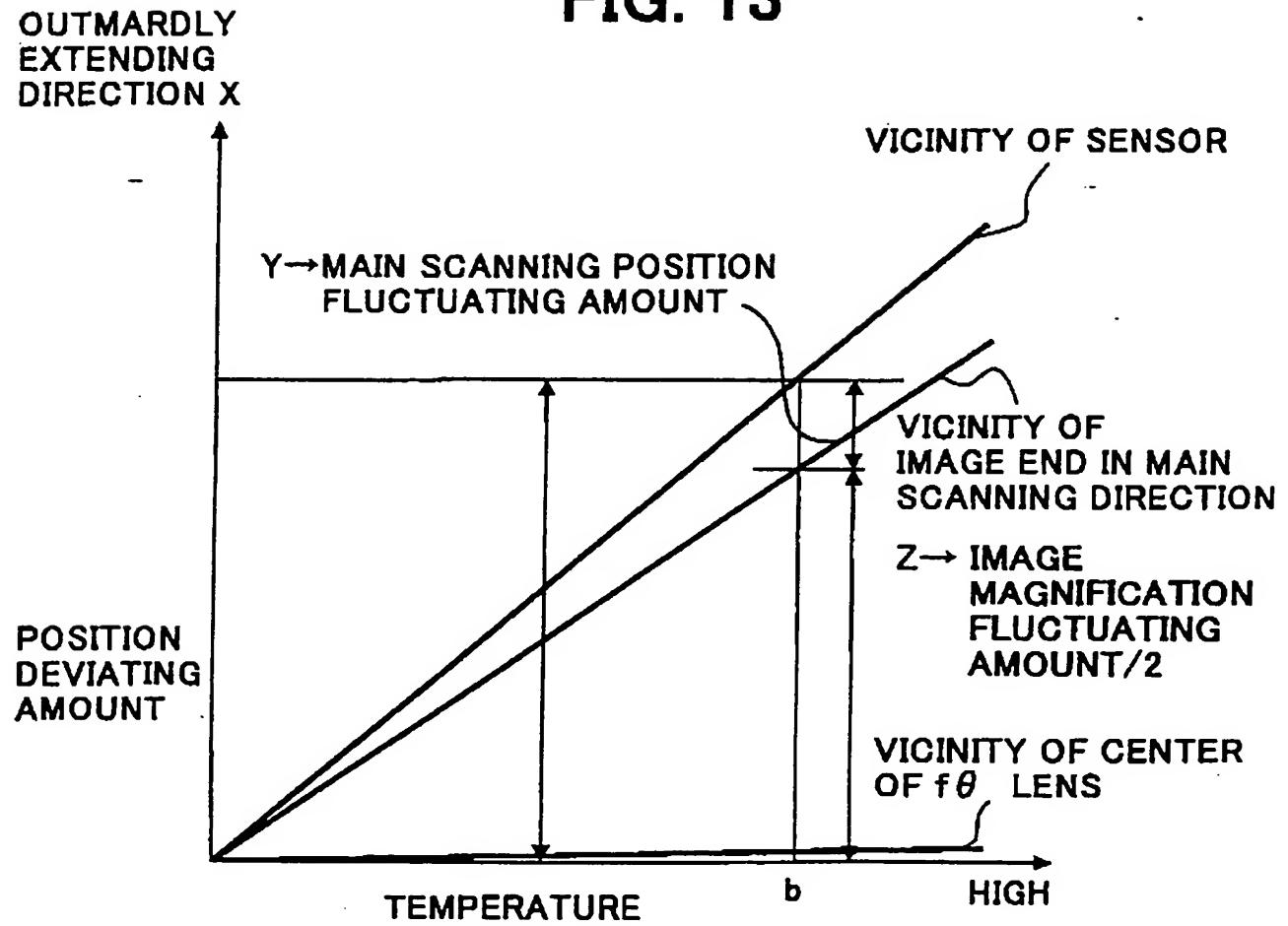


FIG. 14

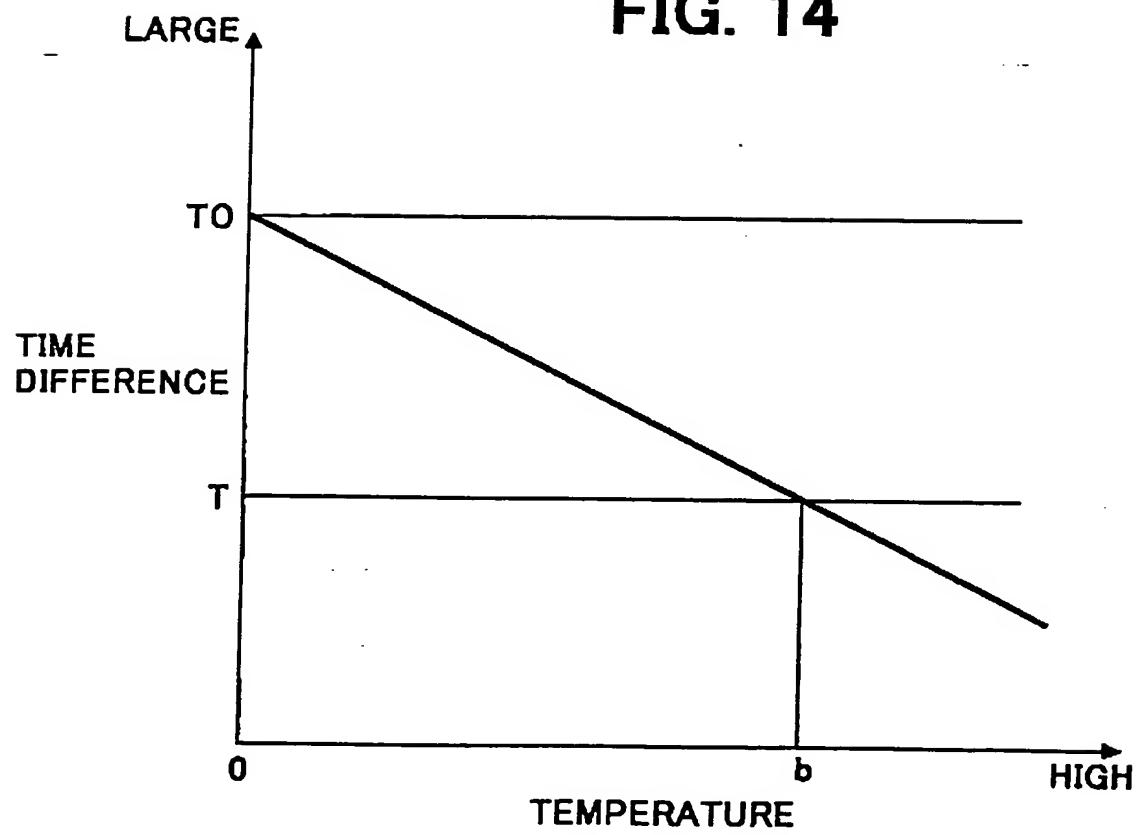


FIG. 15

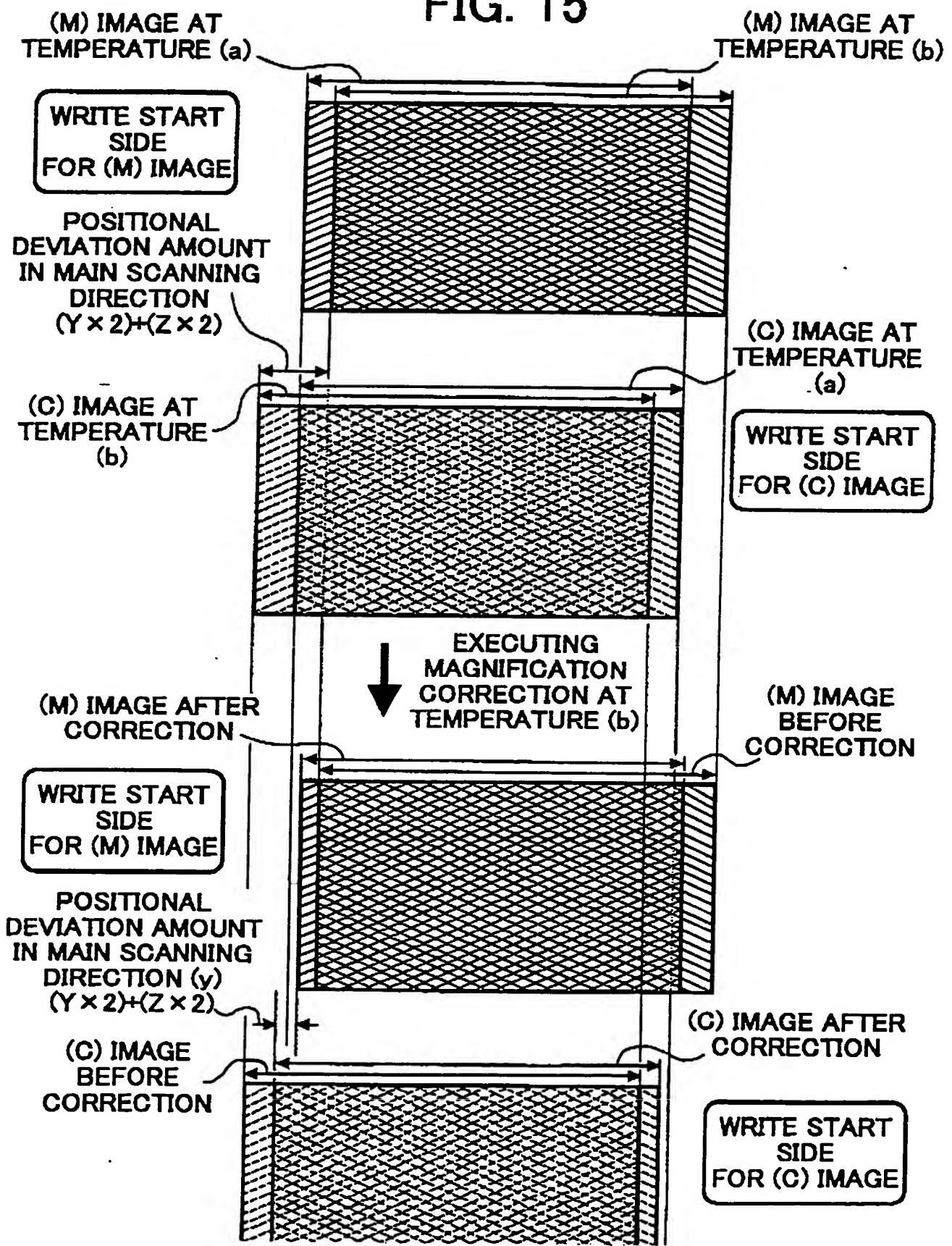


FIG. 16

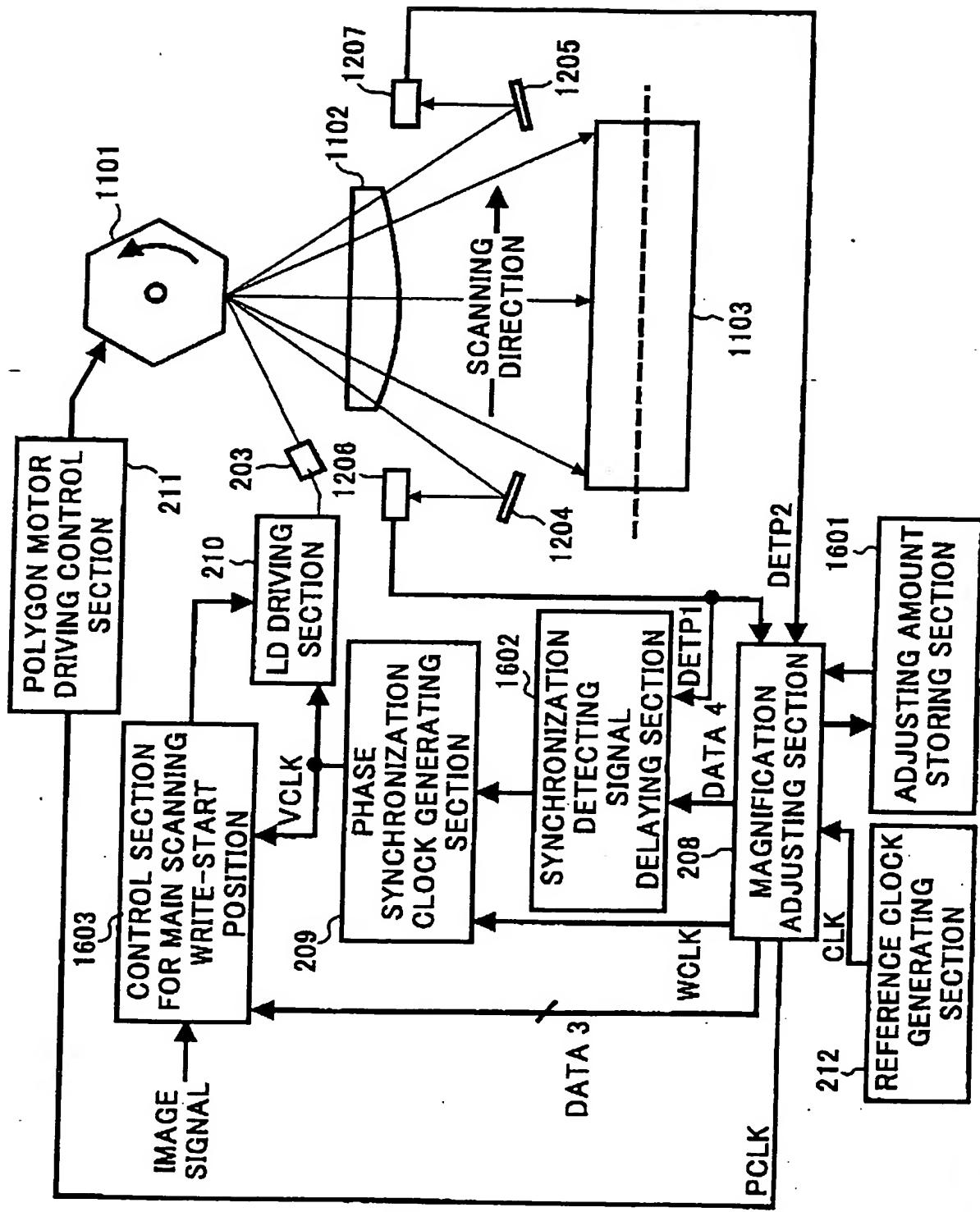


FIG. 17

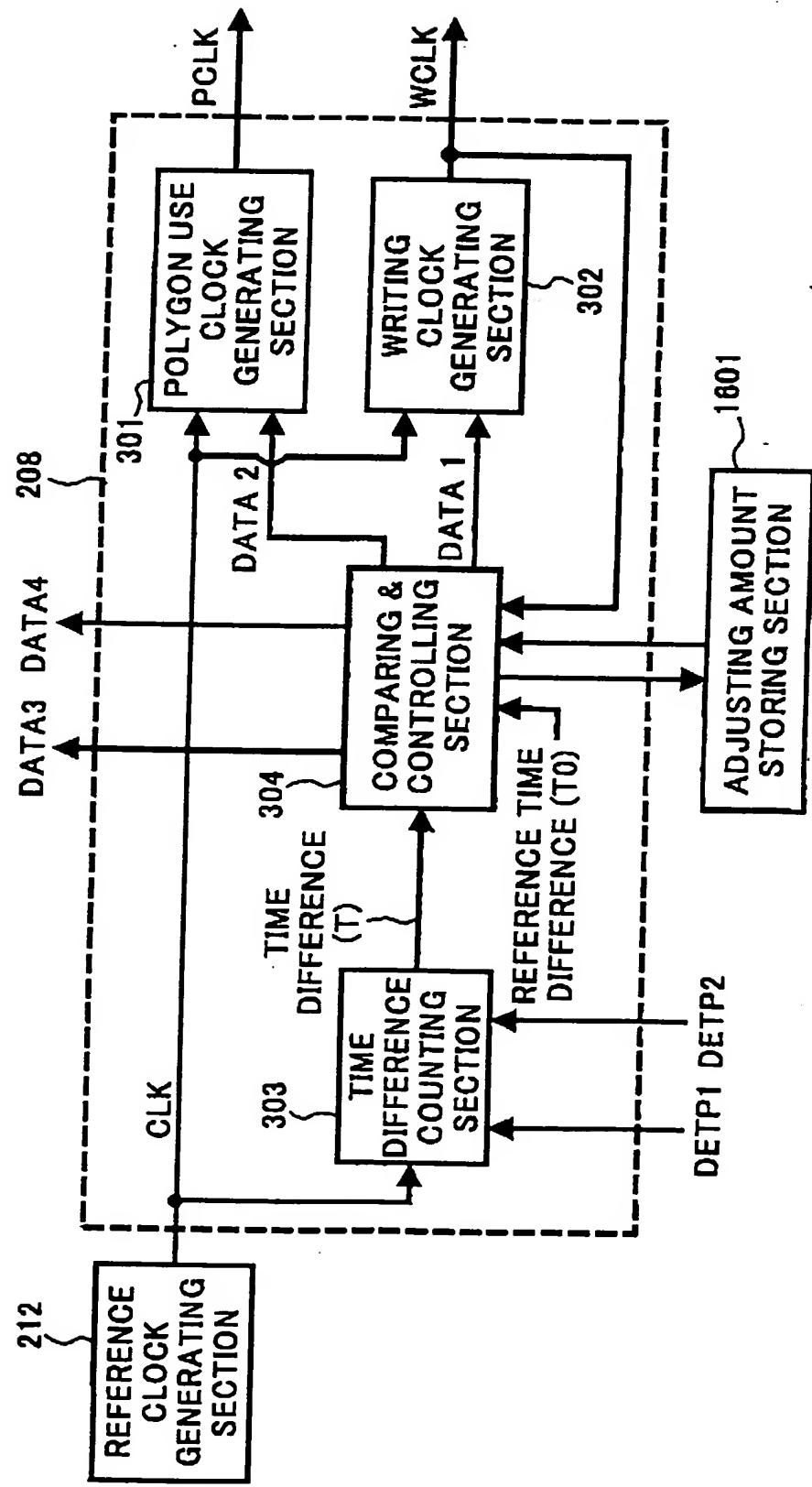


FIG. 18

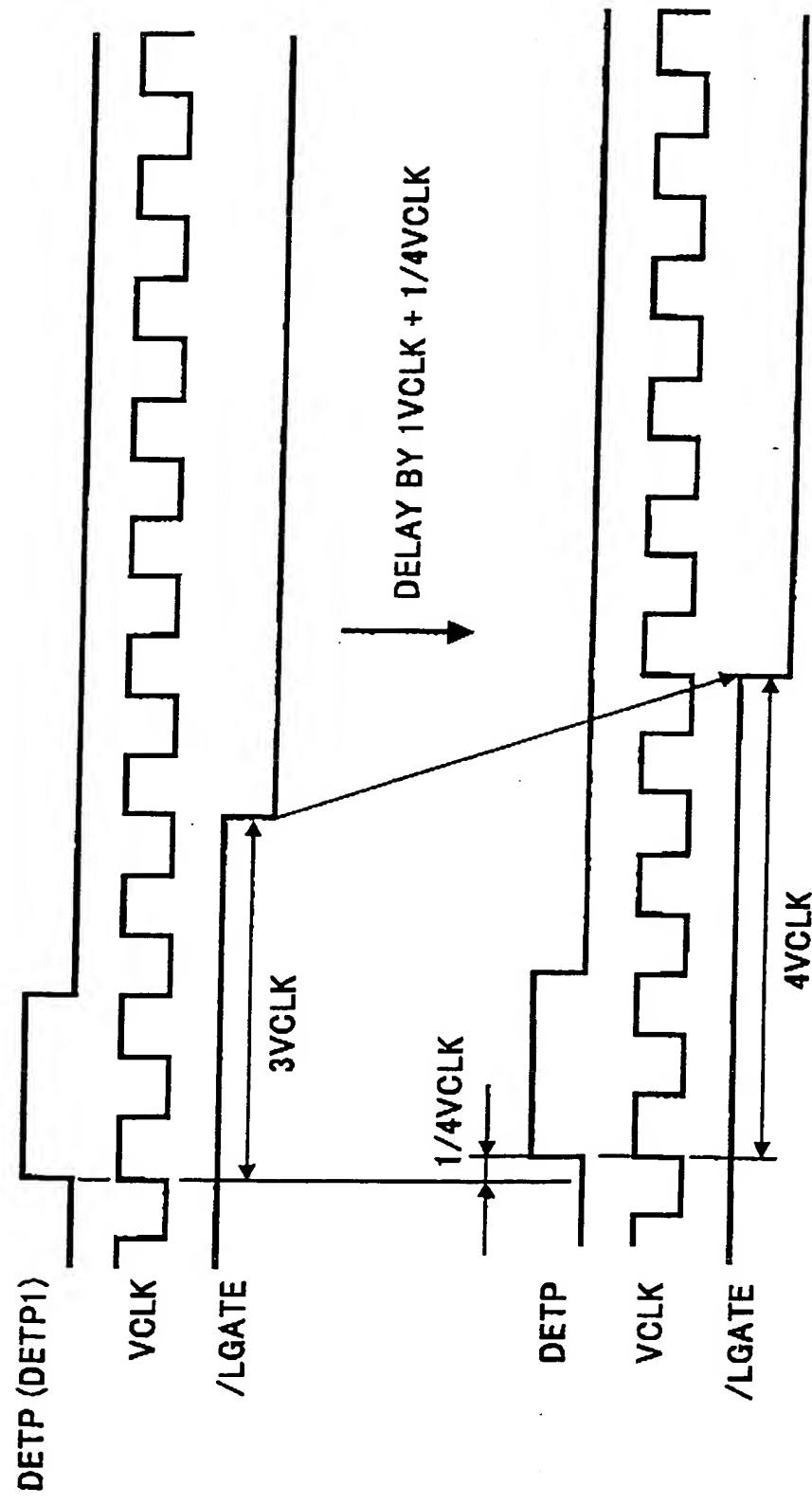


FIG. 19

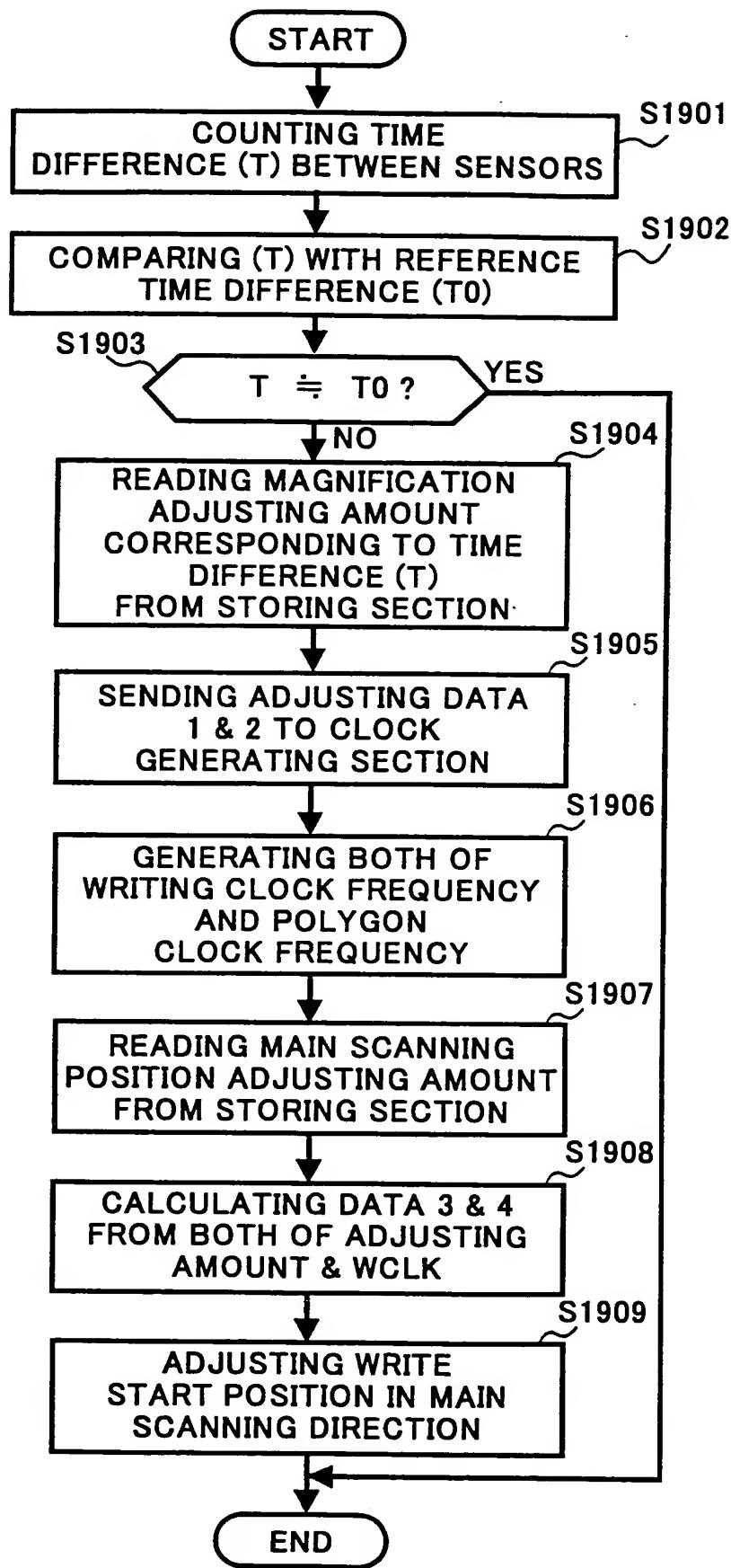
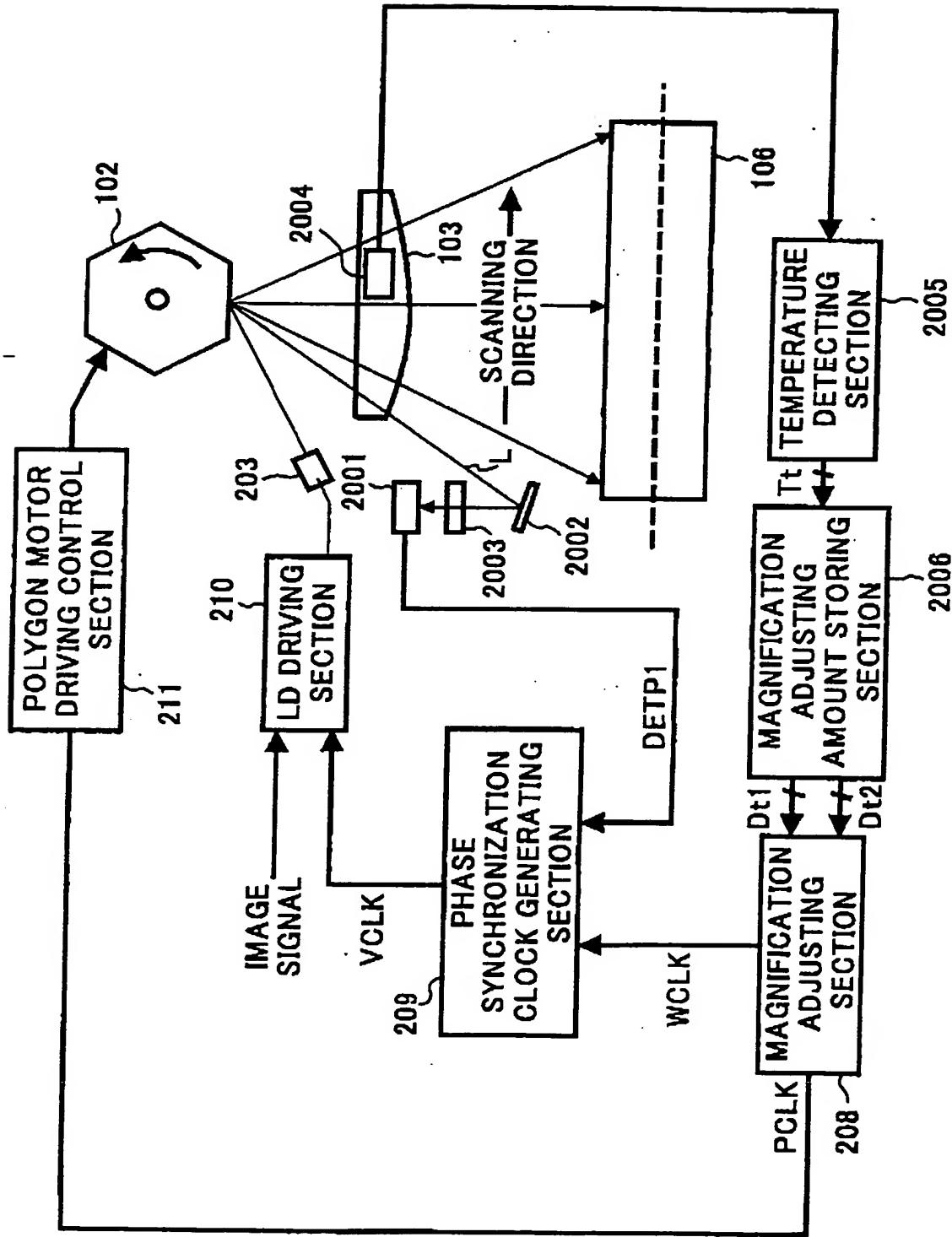


FIG. 20



**FIG. 21**

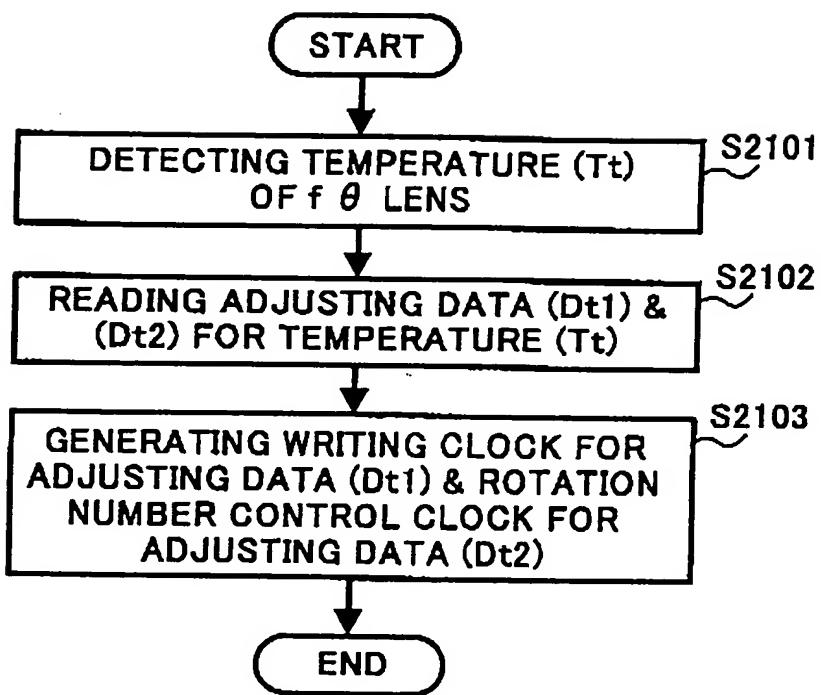


FIG. 22

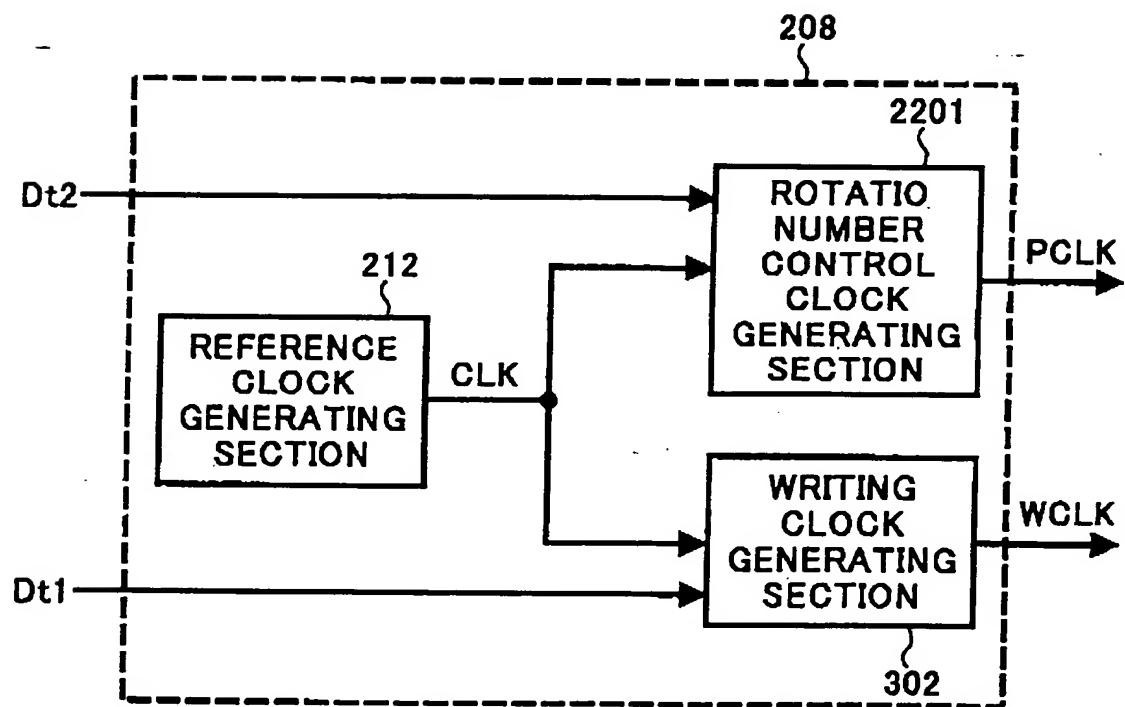


FIG. 23

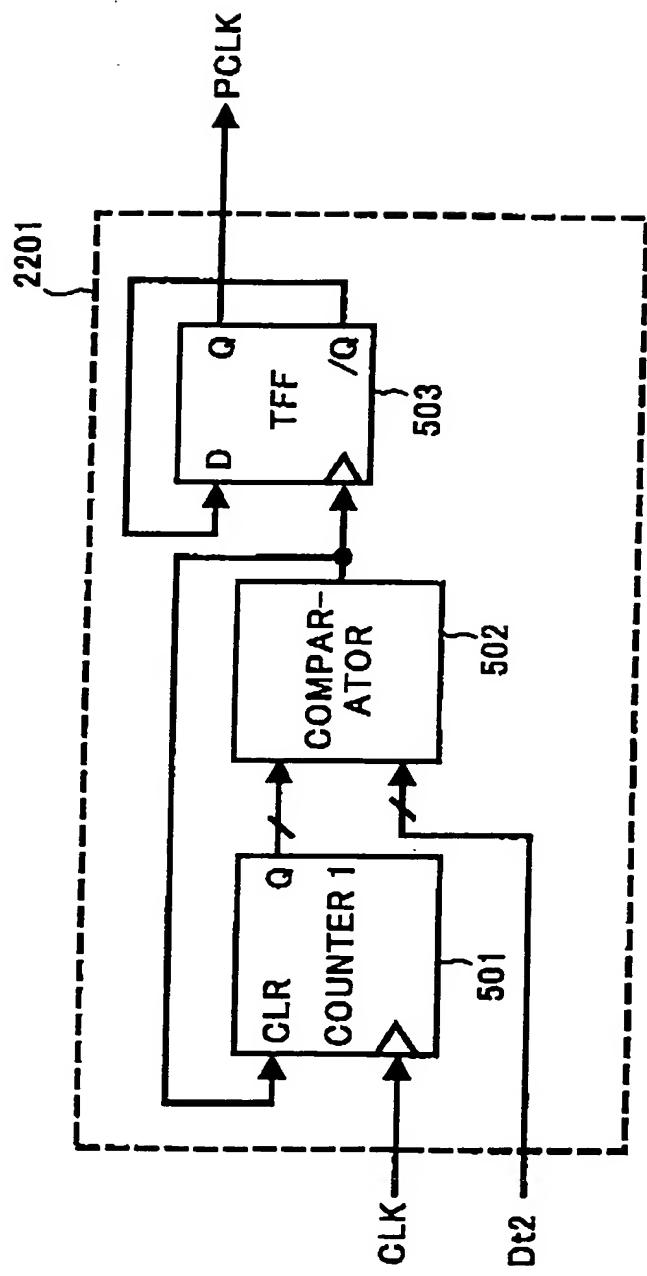
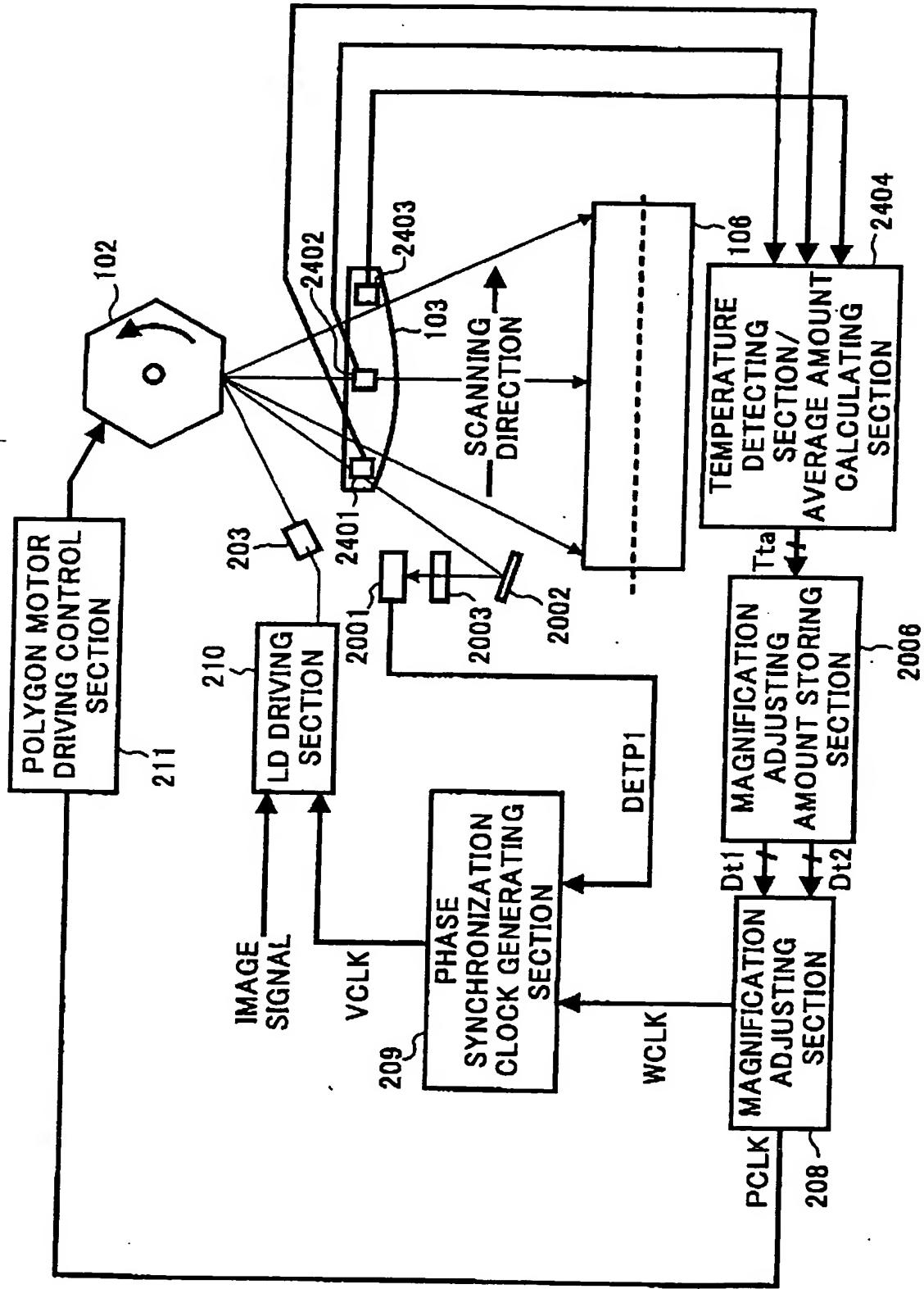
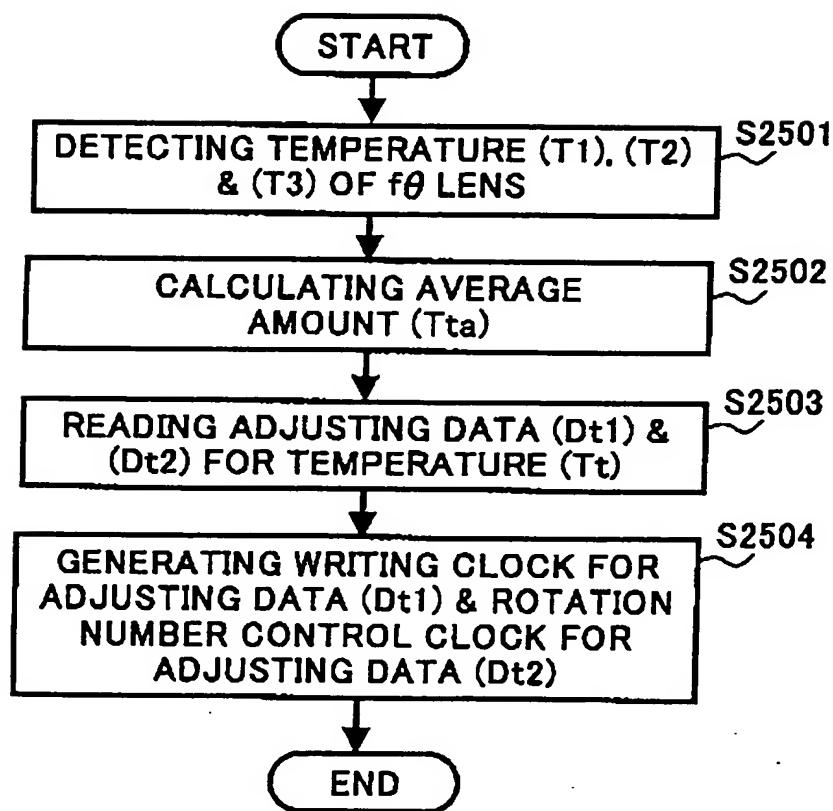


FIG. 24



# FIG. 25



**FIG. 26**

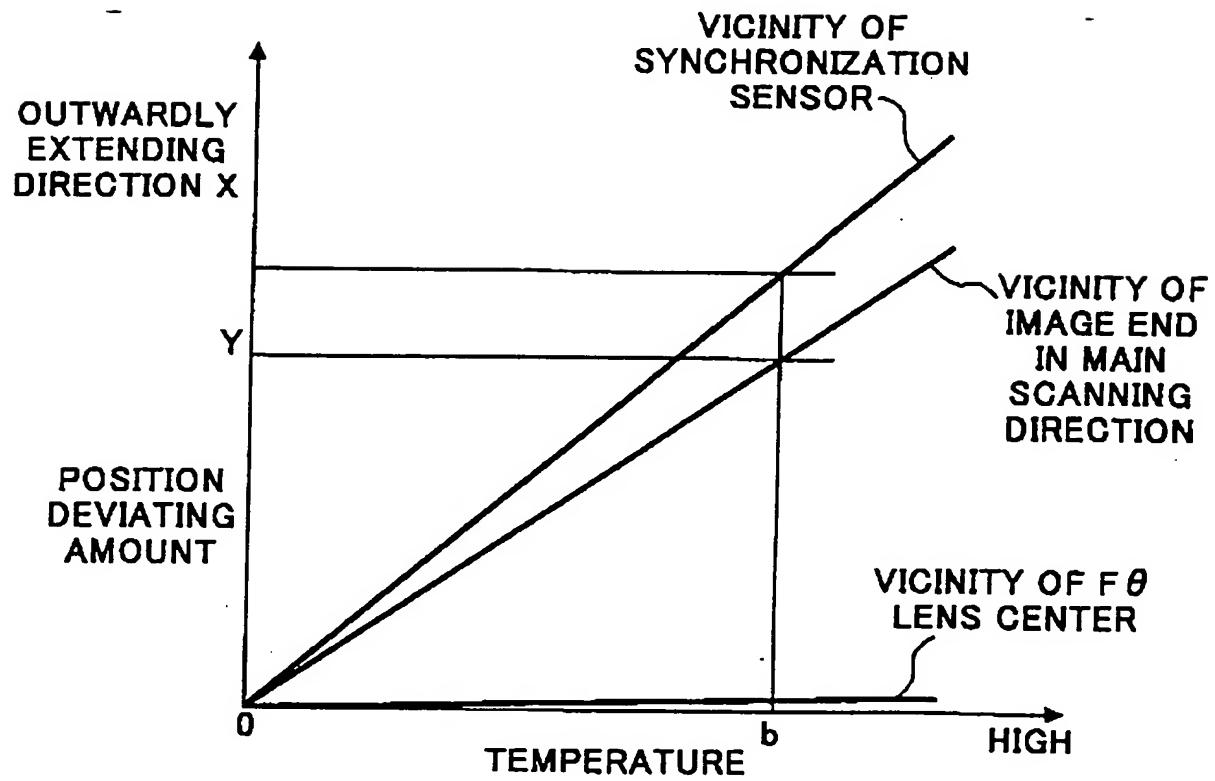


FIG. 27

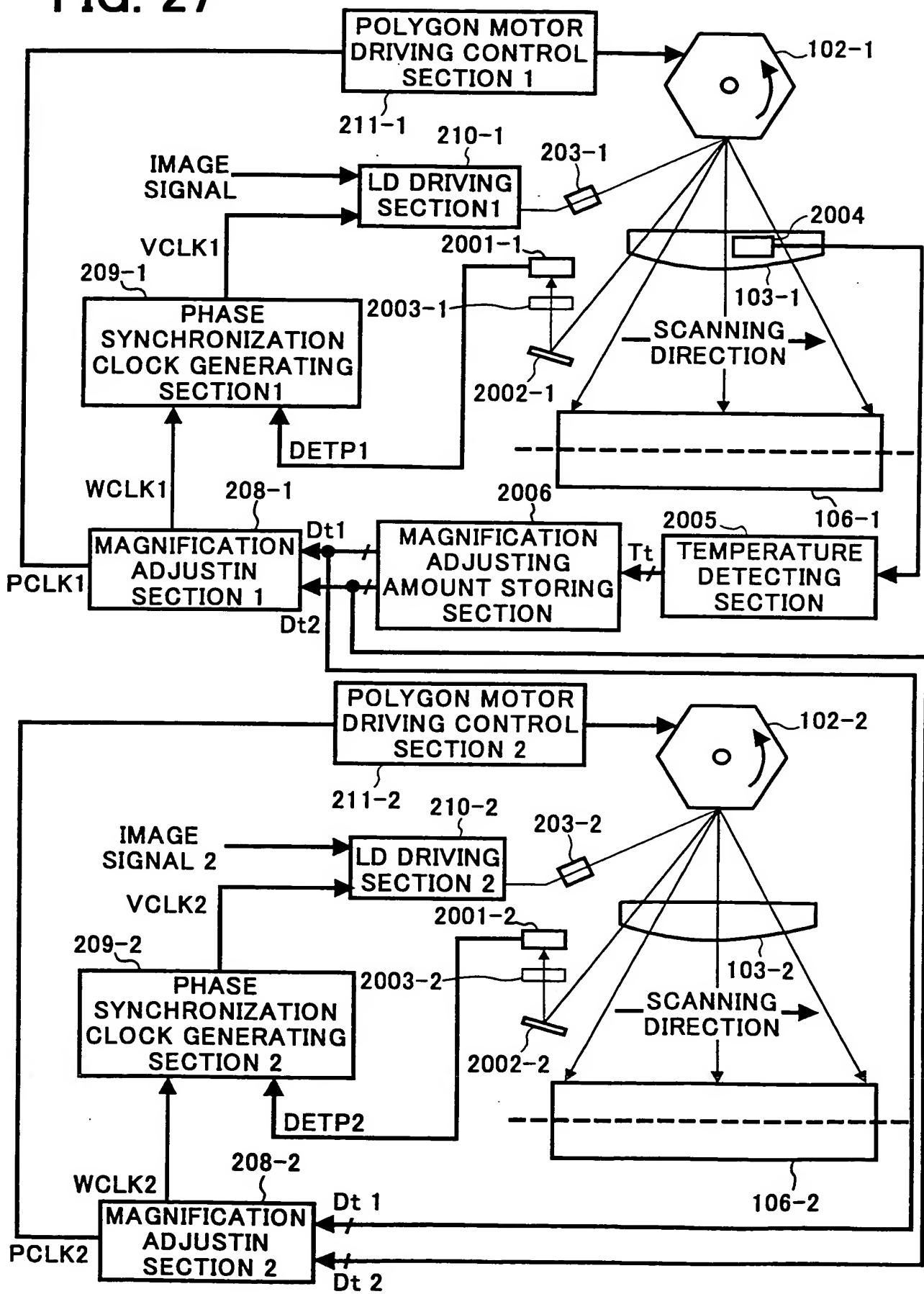


FIG. 28

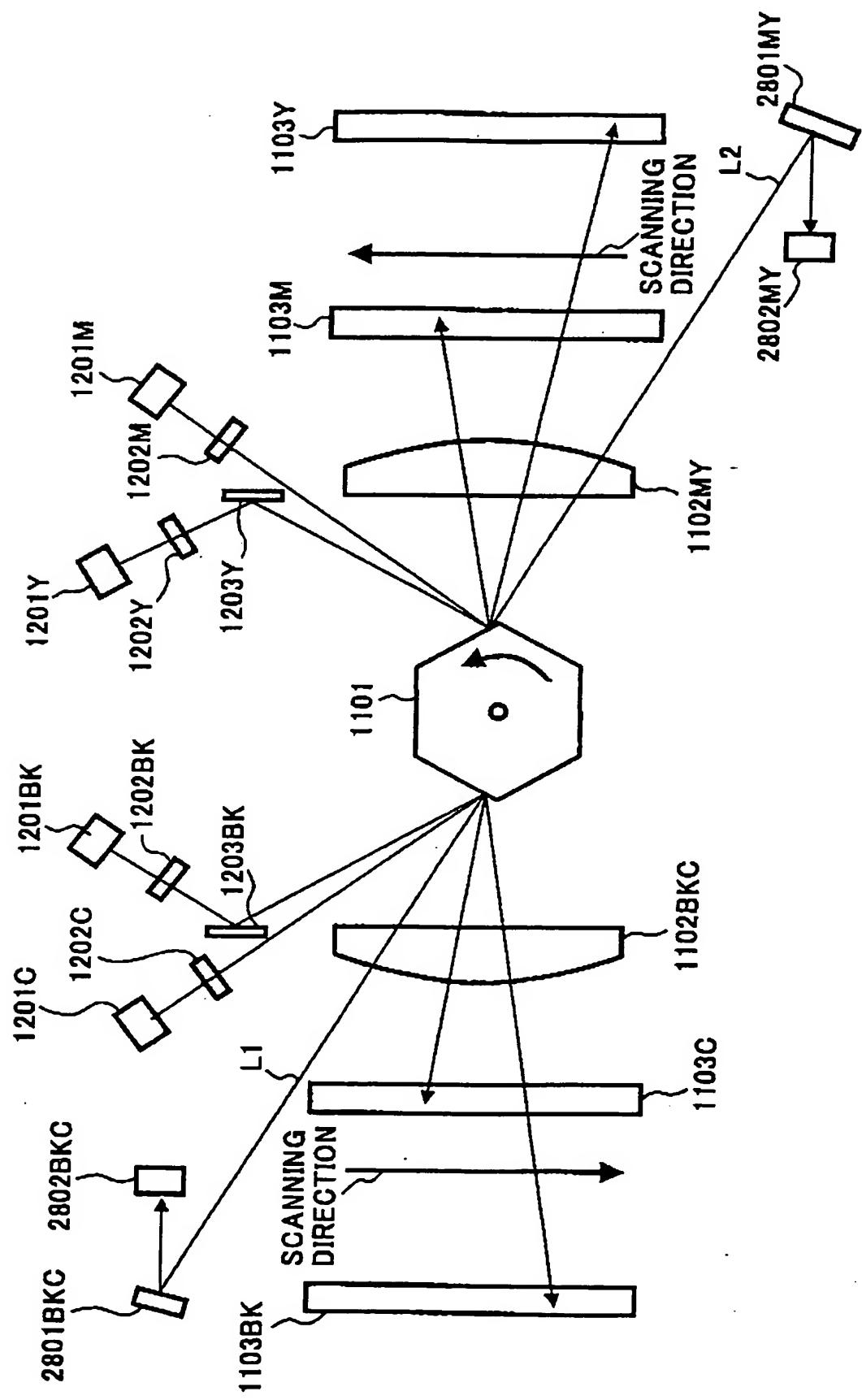


FIG. 29

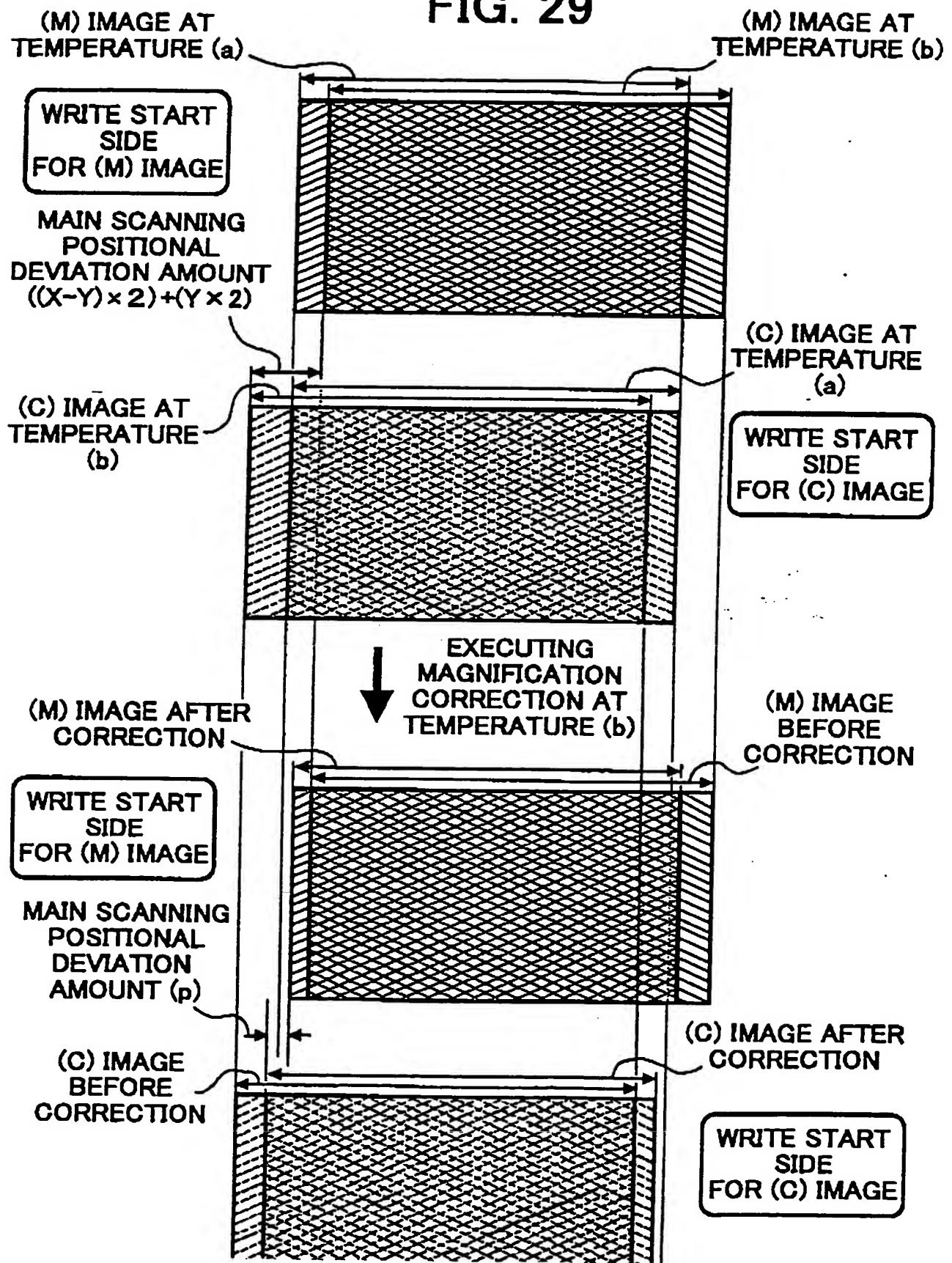


FIG. 30

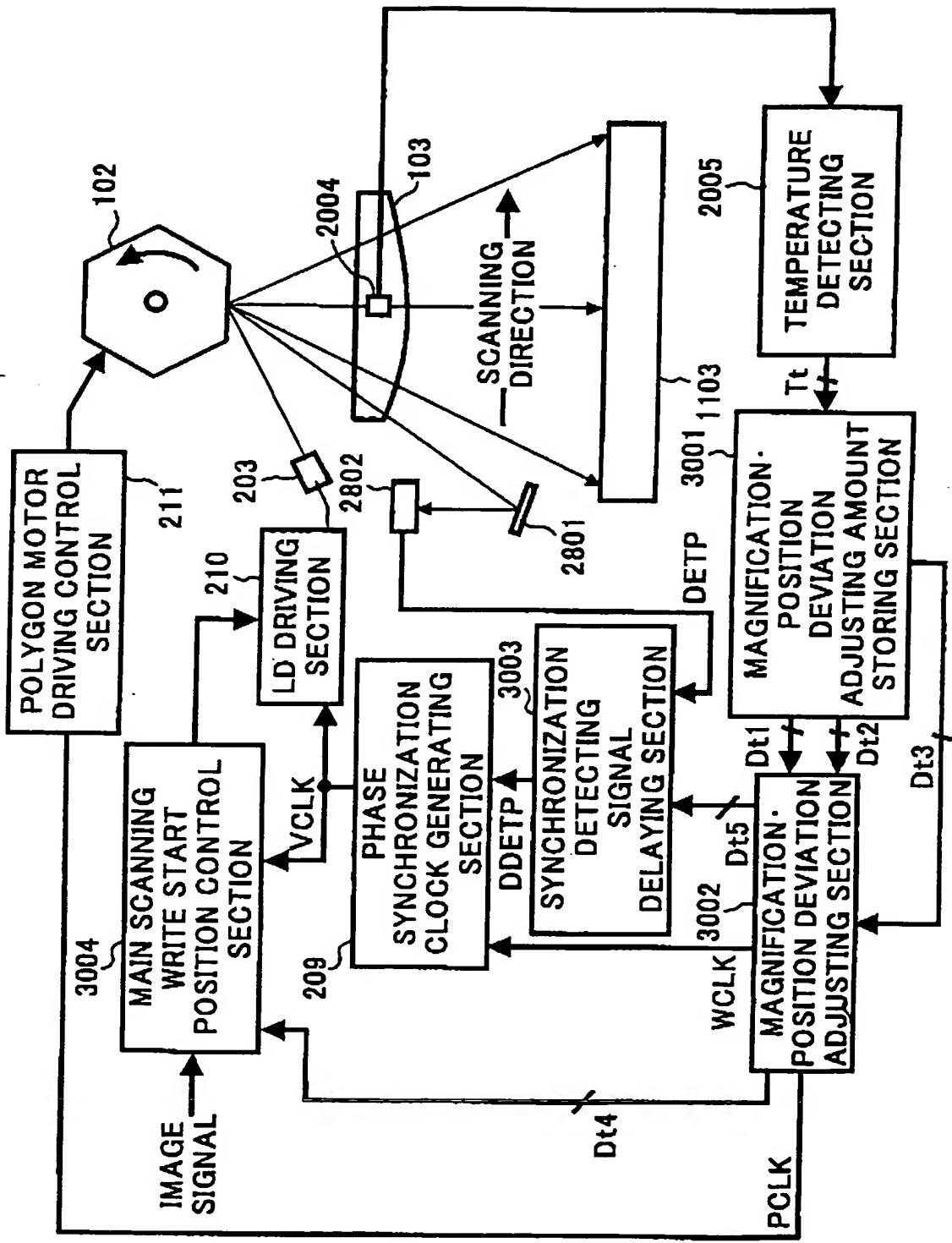


FIG. 31

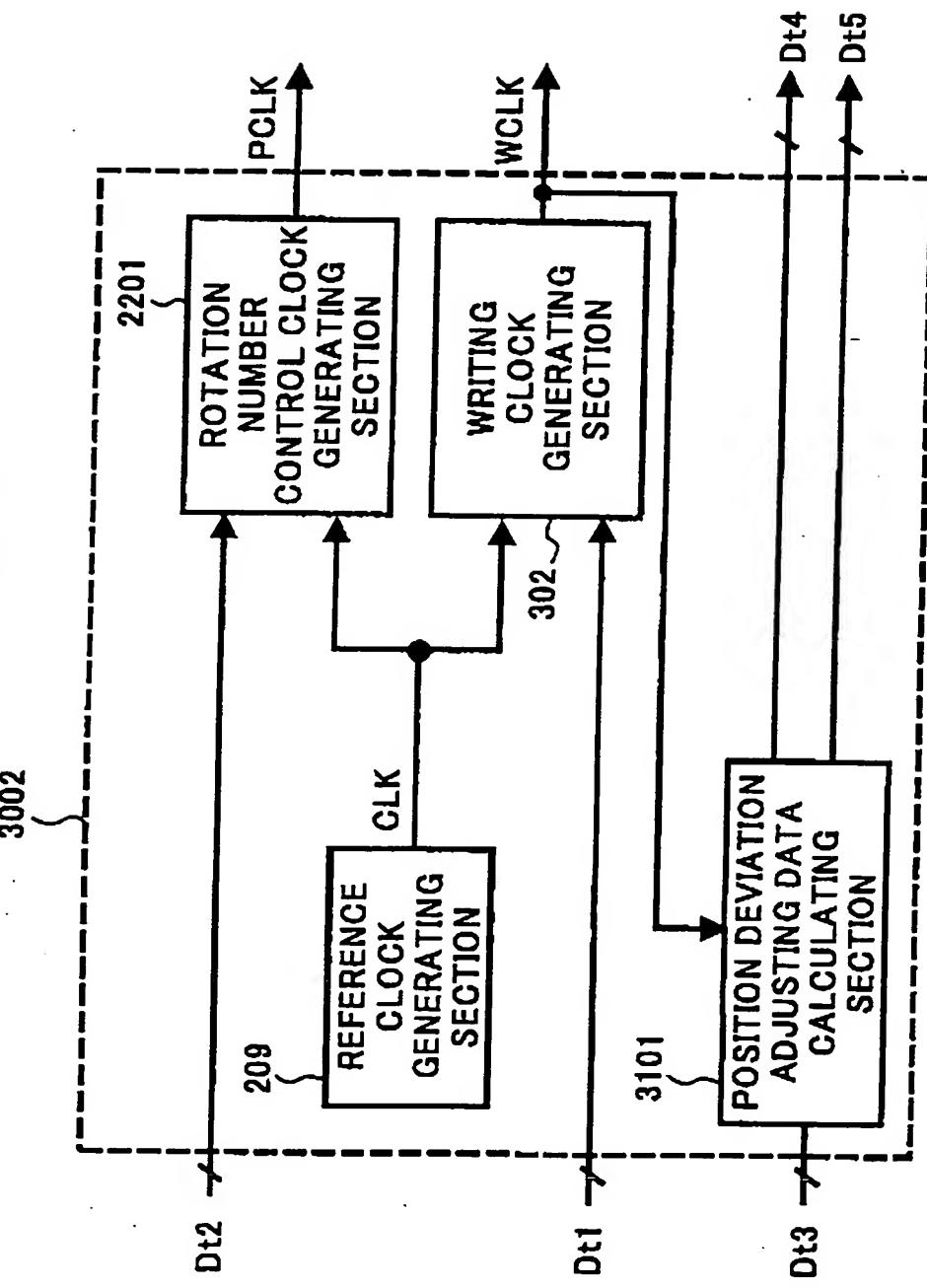
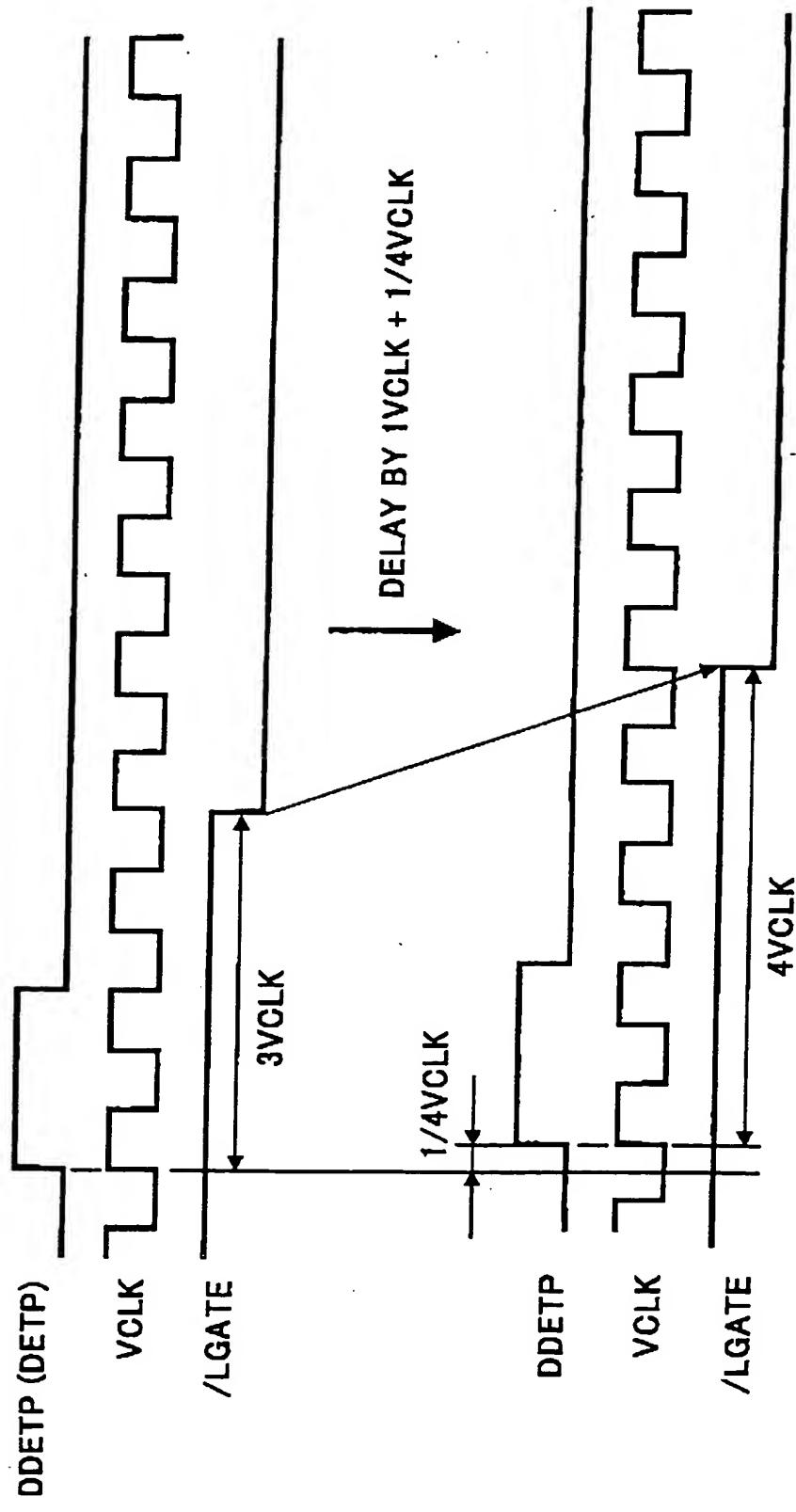


FIG. 32



**FIG. 33**

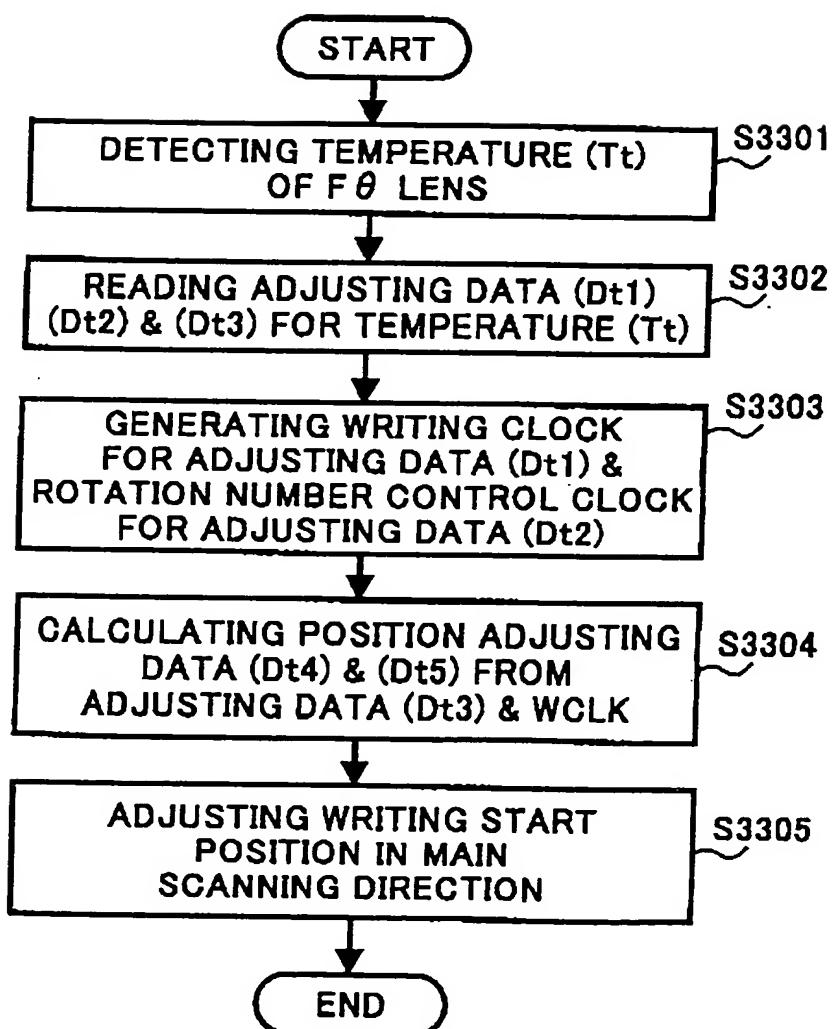


FIG. 34

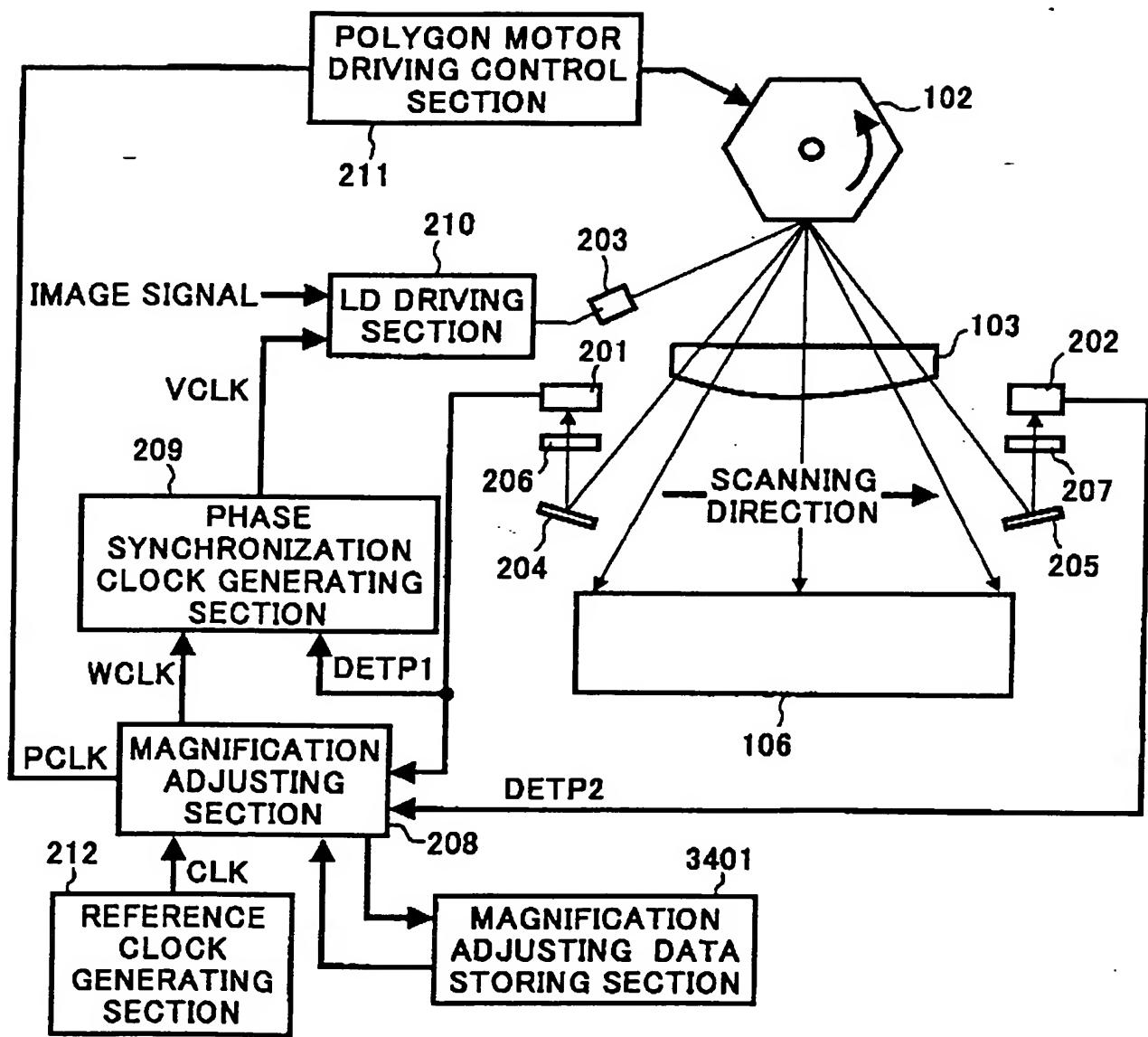


FIG. 35

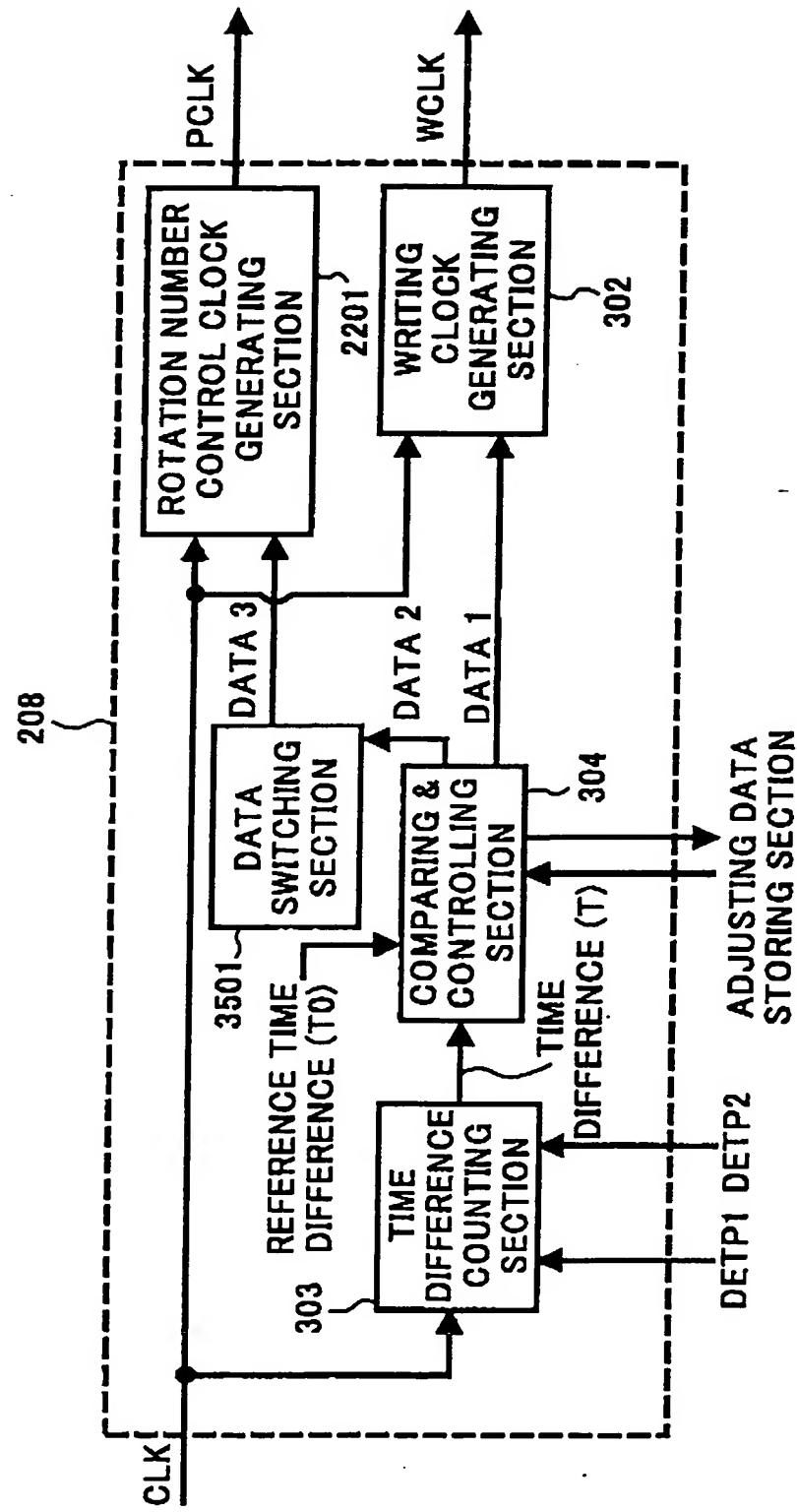


FIG. 36

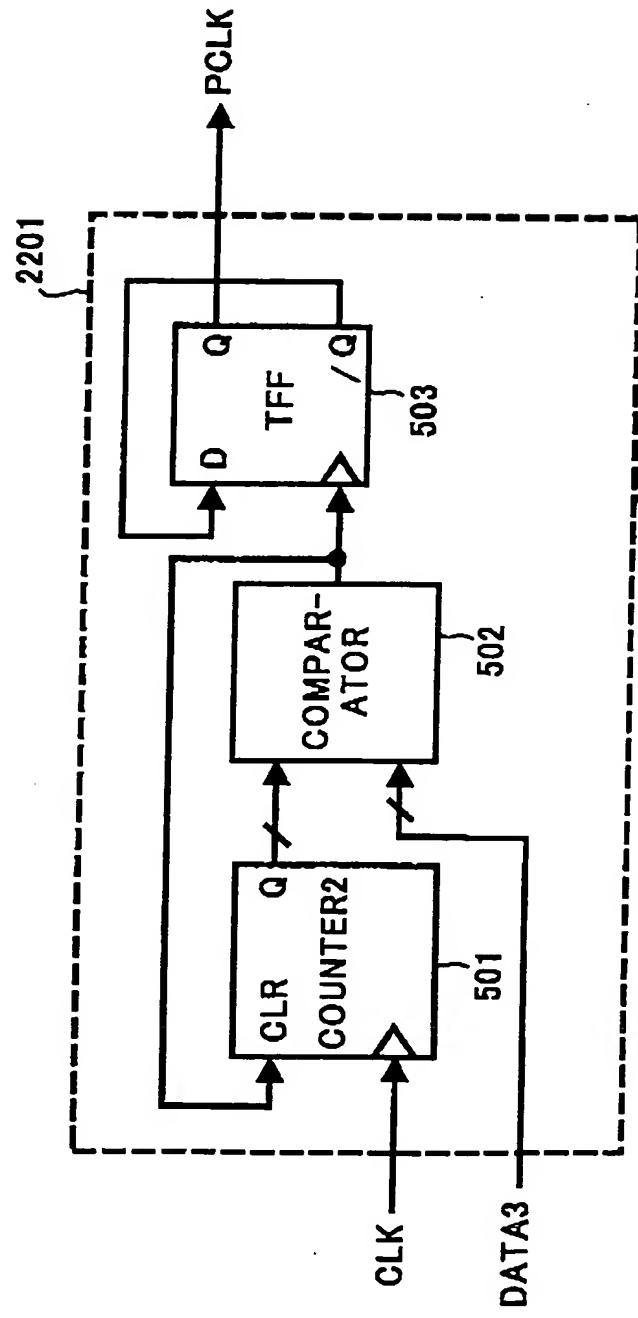


FIG.37

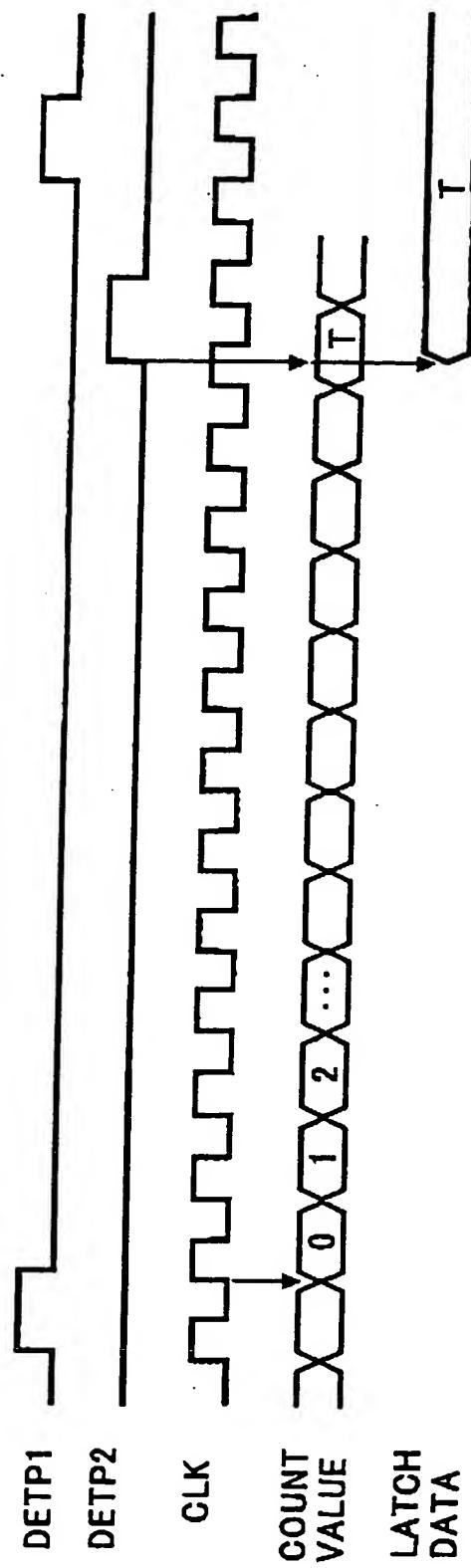


FIG. 38

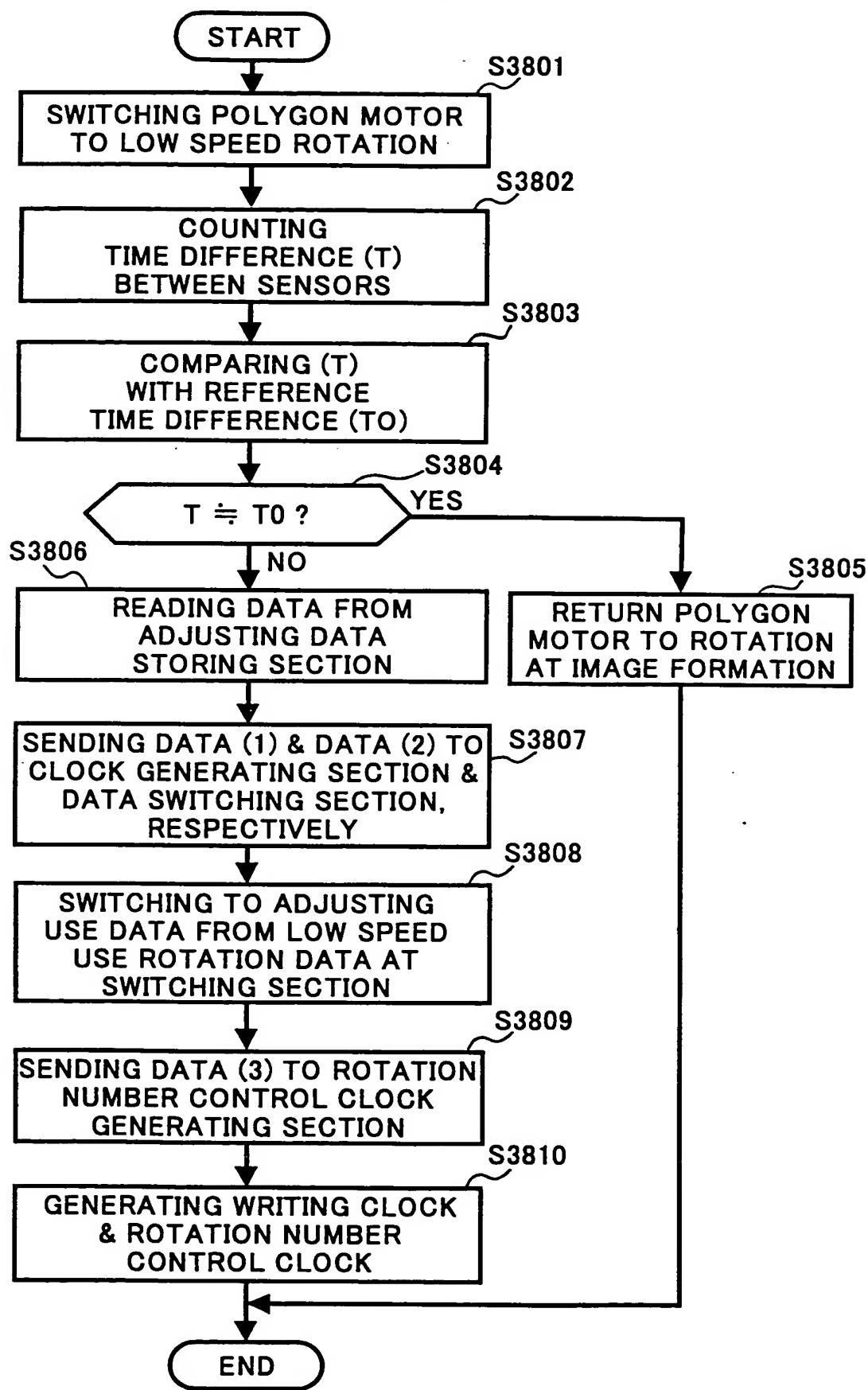
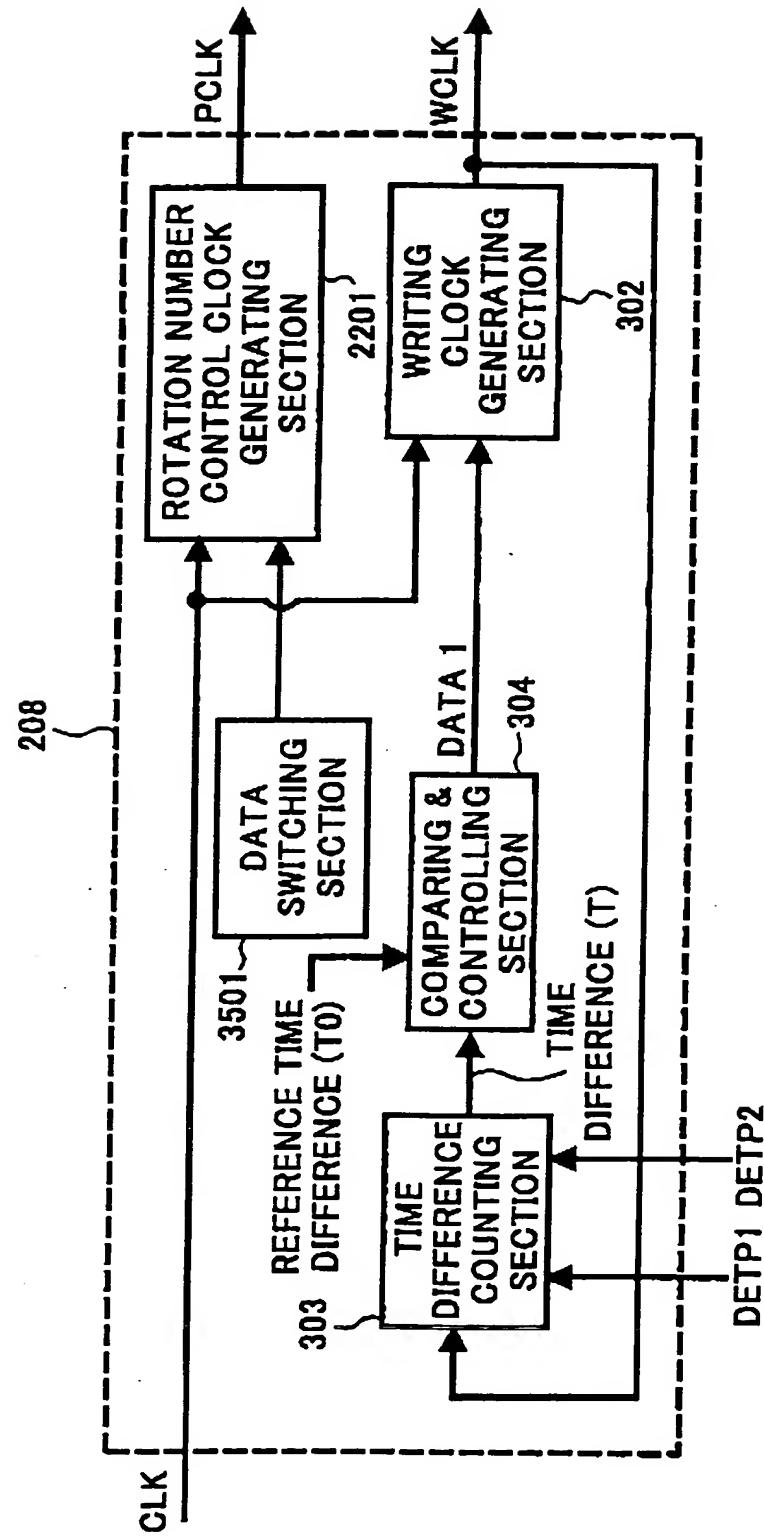
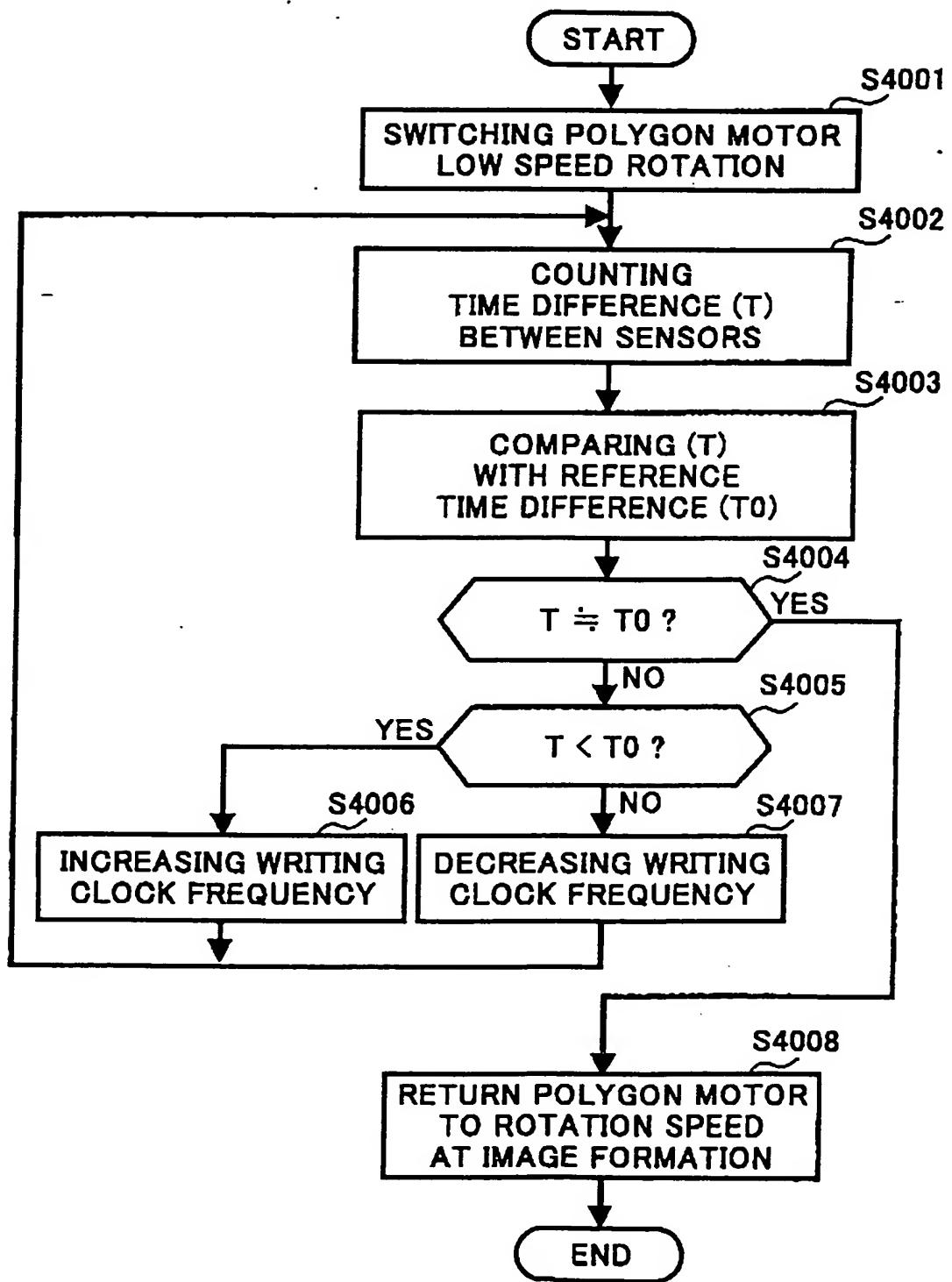


FIG. 39



**FIG. 40**



**FIG. 41**

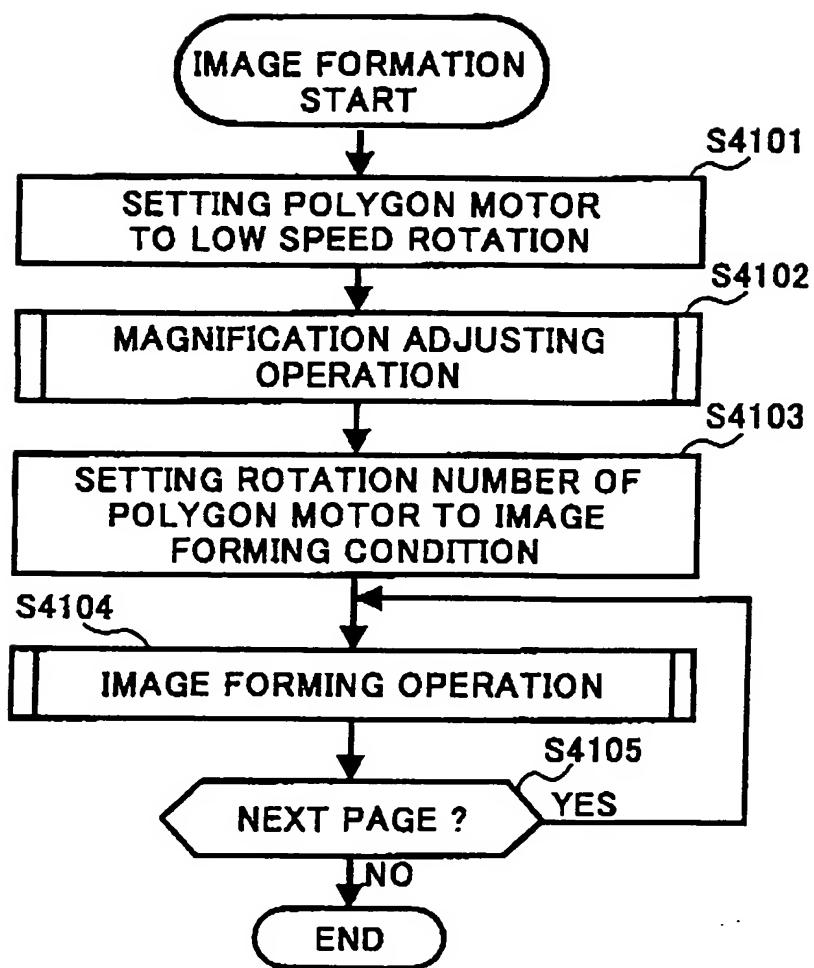


FIG. 42

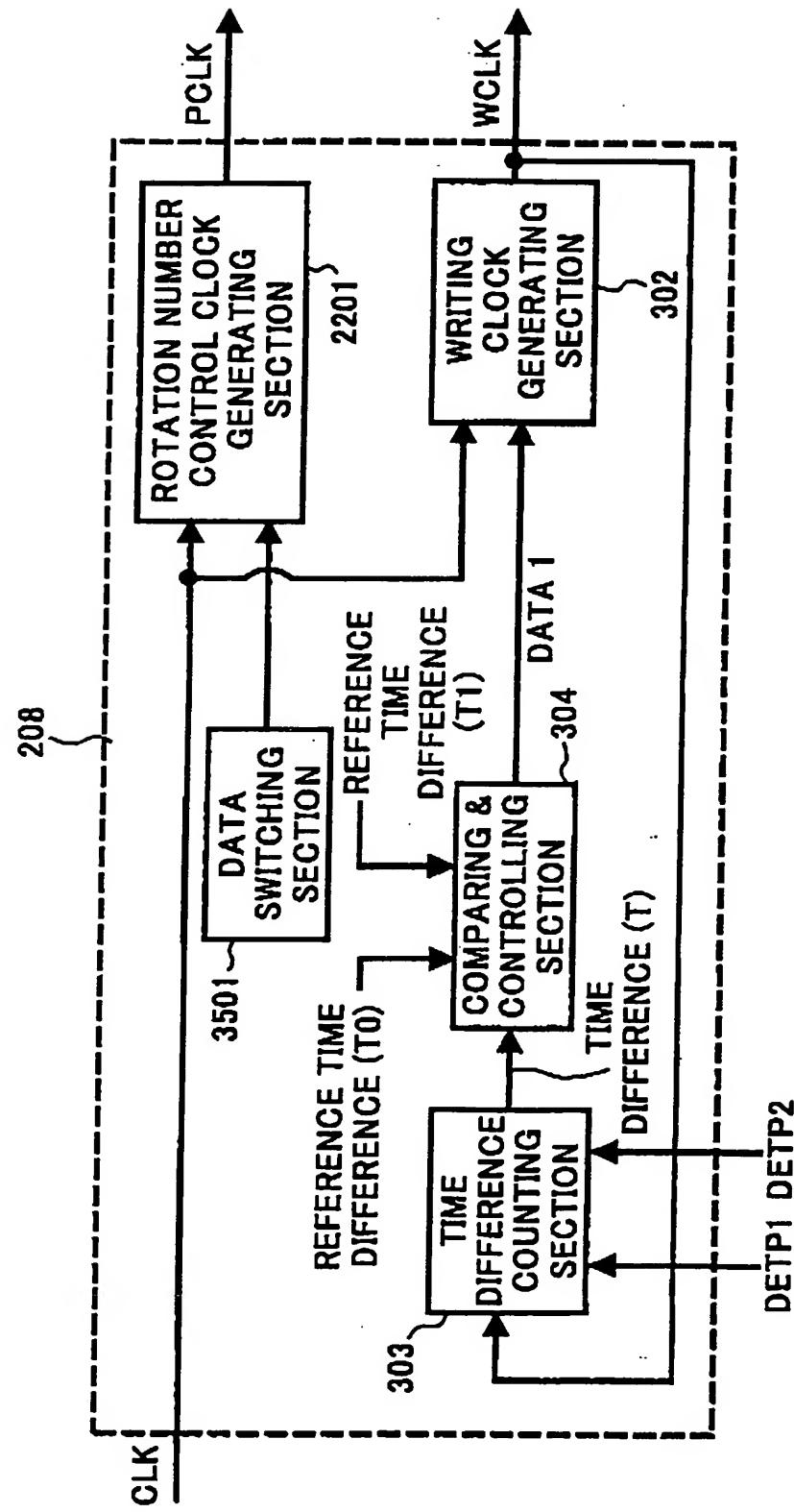


FIG. 43

